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THE USE OF WORDS IN REASONING

BY

ALFRED SIDGWICK

AUTHOR OF
'FALLACIES,' 'DISTINCTION AND THE CRITICISM OF BELIEF,'
'THE PROCESS OF ARGUMENT,' ETC., ETC.

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PREFACE

THE two chief purposes of this book will best be seen by consulting Part IV.; which, by means of the references given in the text, may also be found of service to the reader pressed for time. Parts I. and II. are addressed to any one, however unaccustomed to the study of Logic, who is interested in the distinction between better and worse reasoning; Part III. to those who find it difficult to believe that there is much amiss with the usual account of the leading logical technicalities.

I have again to thank Mr. Carveth Read for the great help he has given me with the proof-sheets, in spite of our many differences of view,—differences the extent of which will, no doubt, undergo in course of time still further limitation and definition. And I have also to thank Miss E. E. C. Jones for much discussion of the MS. under similar conditions. Some controversial exaggerations have in this way been avoided, and if any still remain they will, I hope, be duly pointed out by other opponents.

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PART I

THE NATURE OF REASONING

CHAPTER I

AIM AND METHOD OF LOGICAL STUDY

§ 1.—The Chief Divergence of Method

We may safely assume that no one who sets himself to begin the study of Logic is entirely ignorant of the nature and purpose of that science. He will probably have some false ideas of it, but mingled with these will also be some true ones, even if vague and scanty. At the very least he knows one leading fact about it which will serve as a starting-point: he knows that the main desire and purpose of Logic is to inquire into the difference between good and bad reasoning. It is a common experience to feel convinced that a given piece of reasoning is weak or tricky, and at the same time to find a difficulty in stating clearly its faults. That natural difficulty Logic seeks to remove. It tries to extend and reduce to order our half-formed opinions about the difference between good and bad reasoning; tries to weed the errors out of them and to establish them on a scientific foundation.

Other views[1] of the nature of the central problem are sometimes put forward, but, for reasons which will

[1] See, for instance, *note*, p. 47.

appear in §§ 4-7, they need not be taken as contradicting the statement just given. A real conflict of opinion begins, however, with the question how to set about making Logic scientific; and the chief divergence of view is between those who, more or less intentionally, accept Mathematics as the type of science, and those who do not. The former party seek to base the doctrines of Logic upon a few self-evident axioms, while the latter party regard this attempt as the ruin of Logic from both a practical and a theoretical point of view; they maintain not only that nothing is gained by it but that a false security is thereby encouraged, which hinders the development of Logic and which also directly obscures the distinction between sound reasoning and fallacy.

This chief difference of opinion about the nature of the study corresponds in the main, though somewhat roughly, to the difference between the traditional Logic and newer systems, or between Logic as usually taught for elementary examinations and that larger and deeper study of Logic which is sometimes called Theory of Knowledge. But a better account of it is that the aim of the one party is to make Logic as *formal* as possible, while that of the other is to keep in view the special harm that attaches to formality. Such is the distinction, at any rate, that chiefly concerns us in the present book. Opposition to Formal Logic is a prominent feature of the following account of the use of words in reasoning. And in order that the extent or kind of this opposition may not be unduly misunderstood, some account of its motives and limits must now be attempted.

§ 2.—Different Purposes of Study

In the first place it is freely confessed that formality is only a defect in Logic so far as our purpose in the study is to investigate the difference between good and bad reasoning, rather than to acquire any other kind of (what may be called) knowledge of Logic. If, for instance, our purpose is to get up the subject as quickly as possible and then dismiss it from our thoughts, we should probably achieve this result better by keeping rigidly to the traditional system. The kind of reader here chiefly considered is one who is interested in the main problem of Logic for its own sake, and not merely in order to pass an examination. Our existing text-books attempt to supply both these different needs at once, and inevitably steer a wavering course between them. It seems better to recognise from the first that the two kinds of inquiry are to a great extent incompatible. From either point of view, no doubt, there are logical doctrines to be mastered and technical definitions with which we have to become familiar, but the difference lies in the way these tasks are undertaken. For the one purpose you attempt to learn them like a lesson; for the other purpose you attempt to explore them more thoroughly and at greater leisure. The candidate for examination wants the doctrines laid down by authority, as definitely and decisively as possible, and he wants the technical definitions short and final; doubts and difficulties are a mere hindrance to him, except so far as he can learn that there are two opposite schools or authorities both of whom it is well to quote or mention. He is always under temptation to simplify the subject by assuming

that it is an easy matter to establish the general type of correct reasoning, and to catalogue the departures from it which are prevalent or possible; and that to master the use of the technical terms requires only patience and perseverance in learning a number of definitions. So viewed, the whole study lies in a nutshell; apparently you ought to be able to get up the science of Logic by devoting an hour a day to it for perhaps a couple of months. And this illusion is fostered by the textbooks; they are crowded with detached definitions of technicalities considered apart from their use in expressing doctrines; and the doctrines themselves are mostly not put forward as open to discussion or improvement, but claim to be beyond all question true. In fact, quite apart from any desire to supply material for the crammer, the textbooks generally assume that all the doctrines of Logic may be deduced from axioms as undeniable as those of Euclid, and that unless this is done the 'scientific foundation' is absent.

On the other hand, the attitude of the interested inquirer is that of the larger logical treatises. Even a brief study of any of these will bring before us forcibly the fact that Logic as viewed by them resembles the natural sciences in being progressive and full of problems only partly solved. The more we care about the main problem of Logic, the more we find that one question leads to another—one question requires the previous settlement of another—so that the inquirer's time and trouble are spent for the most part not apparently or directly on the main problem itself,[1] but rather on its preliminaries and

[1] This may help to explain Mr. Bosanquet's desire (*Essentials of Logic*, p. 2) to warn the student against expecting Logic to have a practical bearing on human life. See also *note*, p. 47.

outworks; sometimes on questions of fact about the nature of reasoning in general, or about the connection between thought and language, or about the nature of knowledge itself; and constantly on questions about the meanings of the technical terms. Gradually we recognise that there is no set of positive logical doctrines which are safe against every kind of useful and instructive doubt, nor any definitions of the technical terms which are perfectly satisfactory and final.

§ 3.—The Assumptions of Formal Logic

But, in the second place, our quarrel is only accidentally with the textbooks,—only so far as they keep alive the notion that formality is the strength of Logic instead of its weakness; and there seems to be no good reason why they should always continue to do so. Their treatment of Logic cannot deserve condemnation merely because it is elementary, nor merely because it follows old tradition; it is Formal Logic, as such, that calls for criticism, and its venerable age is an extenuating circumstance rather than part of the charge against it.

The term Formal Logic, as it will here throughout be used, does not mean only the Logic that expressly calls itself formal, though that is naturally the most prominent type of it. The open confession of formality in Logic aims chiefly at the restriction of the inquiry to a specially limited field, and for this purpose certain assumptions are made which we will notice presently. On the other hand, the acceptance of 'formal truths' as satisfactory — a mental habit which is encouraged by these assumptions, but may

also exist without them—is prevalent even in systems which do not specially claim to be formal. It is rather the practice than the profession that matters. We shall find that (excluding works on purely symbolic Logic) even the most professedly formal logicians do not succeed in reducing Logic to perfect formality; and also that no logical system can escape formality altogether. Our objections, therefore, lie only against contented acquiescence in certain principles or habits of thought which tend to make the science more formal than it need be.

First, as regards the restriction of the scope or province of Logic. No doubt there are some purposes for which there must be separate departments of science or philosophy, even if they have to be separated in a somewhat arbitrary way. The harm arises only if we keep to these convenient divisions too rigidly; and that occurs whenever we forbid the raising of a question, relevant to the main problem of the science, on the ground that such question lies outside its scope or province. The limitation of the scope of any science is a matter of convenience from beginning to end, and any particular limitation ceases to be convenient (except of course to the crammer) when it is used to block inquiry precisely at the point where important difficulties have arisen. Why should we stop just there, unless a shallow perfunctory view of the subject is what we are trying to preserve? In intimate connection with Logic there are other departments of study, and we starve Logic in so far as we are eager to insist on their disconnection from it,—their 'otherness.' For instance, the inquiry into the value of special modes of reasoning cannot be carried

far without raising general questions about the reasoning process; and just when a new light is beginning to break on the subject we are warned perhaps that the question is psychological, not logical. Or something suggests a question as to the nature of knowledge in general, and then we are told that the logician has no business in the domain of Metaphysics. And by carefully heading off inquiry wherever it threatens to become difficult, we may in the end so cramp the science of Logic that it becomes a mere collection of misleading formulas, coupled or not with a little elementary Grammar.

The extreme of this kind of restriction is reached, naturally, in the deliberate attempt to keep Logic purely formal. Those who make this attempt explain that when they speak of a piece of reasoning as being formally valid they mean that its validity is determined solely by its form and is in no way dependent upon the particular subject-matter to which it relates. They try to regard the *process* of reasoning as something distinct from the *subject-matter* about which it is employed, and the errors of reasoning which they intend to contemplate are those only which occur in the process so conceived. The older view, still held by some writers, is that the whole of the department called Inductive Logic[1] is thus ruled out. Whately, for instance, was openly scornful of its proposed inclusion.[2] But times have changed, especially since the days of Mill and Bain, and there seems to be a growing

[1] The distinction between deductive and inductive Logic is open to criticism (see § 62); but without at present entering upon that, we may say that Inductive Logic attempts to generalise about the evidentiary force of facts obtained by observation and experiment, and to lay down rules for getting from such facts to trustworthy general knowledge of the course of nature.

[2] See the Introduction to his *Logic*, and § 1 of his Essay on the province of reasoning.

tendency now[1] to recognise Inductive Logic also as formal. At any rate the usual treatment of that subject is formal enough in one main respect,—that it retains the traditional conception of a reasoning process as something separate from its subject-matter, and we shall see how such a conception sterilises the inquiry into the nature of good and bad reasoning.

When the question is raised whether there is any such thing as a process of reasoning, distinct from its subject-matter, the answer depends entirely on the meaning we give to the question. In this respect it resembles many minor perplexities which are more familiar; for instance, the question whether there is such a thing as Luck. In denying the existence of Luck, or of a separate reasoning process, we need not pretend that we are totally unable to understand what excuse any one can have had for assuming these entities; indeed, until we can see the excuse any attempts to remedy the error would have small chance of success. It is only through finding the assumption plausible, and for some purposes true and useful, that we can hope to find the limits of its truth and value; for it is always among the applications of a doctrine, not in the doctrine apart from its applications, that we must search for its qualities and defects. To deny the existence of a separate reasoning process does not necessarily involve our tearing up the old logical system root and branch. We have only to graft a modification upon it and to cut away some exuberant shoots below the graft.

One elementary point to notice is that when people

[1] Mr. Carveth Read, in his *Logic, Deductive and Inductive*, p. 192, expressly says: "Inductive Logic may be considered as having a purely formal character." The same desire is visible also in his earlier book *On the Theory of Logic*.

speak of the validity of a piece of reasoning being determined solely by its form, they are either not speaking carefully or else are overlooking the fact that, in order to get assertions expressed in (what the formal logician calls) logical form,[1] it is often necessary first to consider their meaning,—to consider what is the matter asserted. Since, therefore, in these cases the form is determined by our view of the matter, the supposed escape from material considerations is to that extent at least illusory.

But a more thoroughgoing difficulty is to imagine what can really be meant by a process of reasoning cut off from that which the reasoning is about. There is a way, of course, in which forms of reasoning may be exhibited apart from special subject-matter. We may put letters of the alphabet in place of words, and explain that these letters are intended to have a perfectly general meaning, or to leave blanks to be filled in by any words we please; we may write down, for instance, the argument "All Y are Z, and all X are Y; therefore all X are Z": or again, the plainly inconclusive argument "All Z are Y, and all X are Y; therefore all X are Z";—for instance, "Birds have wings, and so have bats; therefore bats are birds." So far no harm is done, and there may even be some purposes for which these and other skeleton forms of reasoning are useful. But it is when we take a further step that we get into confusion, — when, having distinguished between forms which are valid (*i.e.* formally conclusive) and those which are not so, we seek to identify the invalid forms with incorrectness in the 'process of reasoning,' or the valid forms with the opposite quality. The truth rather is, that in the

[1] See also §§ 30, 57, and 58.

first place (as we shall presently see), where an argument is expressed in an invalid form the fault cannot be satisfactorily traced to the reasoning process as distinct from the subject-matter; in the second place, that the most effective kind of incorrect reasoning occurs where the mere form of the argument is valid; and in the third place, that whether it happens to be effective or not, its incorrectness in these cases evidently cannot be discovered by considering the form alone.

There can be invalid forms, of course; anybody can write one down, and if a decent clothing of words is found for it a certain percentage of people may carelessly pass it as valid. But, when this happens, what is the cause of the error? To say that the reasoning *process* is incorrect is merely a phrase which declines to attempt any explanation; for explanation of an error means the suggestion of a theory as to its causes. Now unless we are content with some such empty answer as that ignorance of the rules is the one cause in all cases,—an empty answer because it evades the question asked and only tells us that invalid conclusions are those which Formal Logic condemns by rule,—it is evident that the actual causes of getting a false conclusion from a pair of premisses must be nearly as various as the minds concerned. The persons concerned may or may not have heard of the rules, or have tried to learn them, and an unsuccessful attempt to follow the rules has a different effect from an attempt to reason directly. When puzzled students, presented with pairs of premisses and asked to draw conclusions, take to guessing, their guesses are of course determined somehow; but the varieties of such determination are

beyond all counting. Different minds will retain different scraps of the rules, and will have undergone different experiences of the success or failure of previous guessing, and will be affected differently by mere jingles of sound.[1] But these guesses can scarcely be called reasoned conclusions at all; at most they are reasoned estimates of the chance that a given guess is right. What is wanted rather is an explanation of the case where a person, with or without some knowledge of the rules, thinks he sees that a certain conclusion does legitimately follow from a given pair of premisses. In such a case can any theory of the cause of failure be suggested except that the meaning of one or more of the statements was wrongly conceived,—given a wider extent of assertion than was in fact intended? For however true it may be that all Z are Y, if you take it as meaning also that all Y are Z, you may thereby change it from a true assertion into a false one; and then your mistaken conclusion that all X are Z results from a defect which is not in your reasoning process but in your conception of the subject-matter.

It may be said perhaps that this is a somewhat imaginative explanation, since we cannot get an instantaneous photograph of the mind in the act of reasoning, but can only give an account of any piece of inference so far as memory and imagination can be trusted to reconstruct the process afterwards. That is quite true, but just because the difficulty is a real one we have no resource but to use our imagination or else give up all attempt to explain the piece of inference. The question is whether definite fault

[1] See also end of § 63. It is chiefly where reasoning operations are made purely mechanical, as in the traditional Logic, that jingles of sound are likely to ape reasoning.

can be found with the above account of it, or a better explanation suggested. It is not as if there were two rival theories and we were in doubt between them, but our choice appears to be between this and none. Since the conclusion of a valid Syllogism[1] is contained in the meaning of its premisses, it follows that to draw a given conclusion from premisses which do not contain it involves some misinterpretation of those premisses.[2]

For the purpose of showing how entirely the phrase 'incorrect reasoning process' fails to account for the error, let us take an example. It would hardly be fair, perhaps, to use one of the excessively obvious cases of inconclusive reasoning which are too often provided in the textbooks, and to ask ourselves if we can understand how it could happen. For instance, the argument (given by Whately) that "White is a colour, and Black is a colour; therefore Black is White" lacks realism too entirely to be a fair example. We must take one of a kind that is sometimes met with outside the exercises for students; one that might mislead, say, half-a-dozen voters among a crowd, or an average schoolboy. Any plausible instance of what Formal Logic calls 'undistributed middle'[3] will serve very well; for example, "Bad workmen complain of their tools; X complains of his tools, and therefore X is a bad workman." Now the question is, are we to suppose that the person drawing this inference sees clearly

[1] This technicality is explained in next chapter.

[2] One of the commonest kinds of such misinterpretation is the tendency to take 'all Z are Y' as equivalent to 'all Y are Z,' but some others are noted at the end of § 63.

[3] Such arguments are always reducible to the following type: A case (or set of cases) X, and a class Z, agree in possessing the feature Y; therefore X belongs to the class Z.

the difference of meaning between the statement that bad workmen complain of their tools, and the statement that those who complain of their tools are bad workmen, and that seeing this difference he nevertheless 'reasons incorrectly'; or are we to suppose that he fails to see the difference clearly, and reasons to his false conclusion 'validly' from a major premiss which is false?

It is fully admitted that no one can do more than imagine what takes place in the mind of the faulty reasoner. But why should we do less? Why should we assume that his mind has acted in a wholly unintelligible manner when we can so easily make the process intelligible? The second explanation above suggested refers us to a cause which is itself familiar. We all know that assertions are frequently misunderstood; that facts which are true as they stand expressed may be incorrectly conceived by the audience and so falsified. Every one of us often is, and with very good reason, doubtful whether a given sentence of the form 'All Z are Y' is or is not also intended to cover the assertion that all Y are Z; there was a time perhaps when we were hardly awake to the fact that there could be any difference of meaning between them. And if we suppose this common uncertainty actually arising it explains the false conclusion at once; the *reasoning* was correct, but one of the statements was taken in a sense which made it false.[1]

The notion of a process of reasoning which can be

[1] Formal Logic may plead that by means of its rule against 'simple conversion of A' it specially guards against this danger. That is true, and the rule is a good one if not taken as implying that the form of the sentence decides its meaning. But the existence of the rule does not alter the fact that what Formal Logic would call an invalid syllogism may rather deserve to be called a valid syllogism with a false major premiss.

faulty apart from mistakes in the subject-matter becomes less and less intelligible the more we inquire what sort of existence it could have. That the process may be spoken of 'in the abstract'[1] is of course admitted; we may speak of things in the abstract as much as we please, at least when any clearer insight into facts is to be gained by doing so. But to imagine that because we can do this therefore abstractions have independent existence is to forget that they are, after all, abstractions. It would be a good exercise for the student to try to make clear to himself what a process of reasoning can be when entirely cut off from the matter reasoned about; or a process of thinking without anything thought about; or a process of building, without materials used. Whatever purpose such abstractions may serve, the one purpose they never can serve is that of throwing light on the difference between performing the operation well and performing it badly; for the same operation with different materials gives widely different results.

But the attempt to separate the reasoning process from the subject-matter is not the only radical defect of Formal Logic. There are also some other half-true assumptions made by it, more or less systematically, which become untrustworthy just at the point where, in applying logical doctrines, doubt and difficulty and difference of opinion arise—just at the point, therefore, where common-sense views show their weakness, and where a more elaborate Logic is wanted. Of these, two which render the technical terminology useless in cases of doubt and difficulty are:—

[1] For a first account of the meaning of the word *abstract*, see § 6.

The assumption that the 'logical character' of a word, or of an assertion, belongs to it quite independently of its context; and—

The assumption that a sentence which is intended to express an assertion is the same thing as the assertion which that sentence is intended to express.

The first of these requires to be discussed in connection with the technicalities in detail, and is therefore reserved for Part III., but the second admits of a little discussion here.

If failure to express a clear meaning can ever occur,—if there can be two different sentences[1] expressing the same assertion, or two different assertions expressed in the same form of words,—then it is evident that sentence and assertion are not the same thing, and that to use the word 'proposition'[2] to cover both is to go out of our way to create perplexities. As a help in guarding against them, it is better to say 'assertion' when we mean assertion, 'sentence' when we mean sentence, and 'pro-

[1] *Complete* identification of sentence with assertion is not, so far as I know, openly and directly proposed by any logician, and probably could not be consistently preserved. In fact, formal logicians may be found disputing among themselves whether 'Victoria is the Queen of England' is or is not the same assertion as 'Victoria is England's Queen,' and in similar cases of slight verbal change. On the other hand, it is notorious that a creed may be held in many different senses. For some remarks on the 'immediate inferences' of Formal Logic, see § 64.

[2] The word 'proposition' is one of the worst sources of confusion in Logic. Several of the textbooks openly define it as an assertive *sentence*, or a sentence indicative, and then proceed to talk of propositions as having certain relations to other propositions,—including or excluding them, for instance. Evidently they are here speaking not of the sentence but of *the meaning of the sentence* (*i.e.* the assertion); for the sentence 'All X are Y' no more includes the sentence 'Some X are Y' than the idea of a spade can dig the idea of the ground. The relations which are of interest to Logic are between assertions, not between sentences; any possible relations between sentences are of a wholly different order; *e.g.* one may be longer than another, or more sonorous, or more grammatical. It is the assertion, as opposed to the sentence, which is true if another is true or false. It is only as confused with the assertion that the sentence can be viewed as capable of truth or falsehood. For the relation between the assertion and the 'judgment,' see *note*, p. 59.

position' only when the context makes it clear which of the two is meant, or when both are meant indifferently. As we shall have several opportunities of seeing, the slight trouble required for avoiding this common confusion is certain to be a saving of trouble in the end.

Yet the difference is not always easy to remember. There are two chief sources of difficulty in holding clear the distinction between assertion and sentence. The lesser of these consists in our need for using concise ways of speech. We cannot be always saying "the assertion intended to be expressed in the sentence 'All men are mortal'"; for convenience we say "the assertion 'All men are mortal'" instead. But the more important of the two difficulties is of another kind. Take any case where we recognise that a meaning expressed in words is not quite what the words strictly ought, or strictly profess, to mean—for instance a statement evidently too general, presumably not insisted upon to the full in our cooler moments; like the Psalmist's hasty assertion that all men are liars. We may soften it down as much as we please, but nevertheless the amended meaning itself can take no other form than that of a sentence. By stating the 'real meaning' of a sentence in other words we only raise up the same difficulty in another shape. However often the process is repeated we cannot escape the need of expressing the assertion in some sentence or other.

The difficulty, then, is that the distinction between assertion and sentence is clear only in its 'idea.' When we ask for actual cases of assertion they cannot be produced otherwise than in the form of sentences. Hence, if we are not careful, we get into the habit of simply identifying the assertion with the sentence, and

so increasing our natural tendency to forget that sentences need care in interpretation. One of the greatest helps towards preserving clear views in Logic consists in avoiding the false assumption that forms of sentence have some peculiar virtue which binds assertor and audience equally to a single indisputable meaning. Any Logic which commits itself to this assumption is thereby cut off from the hope of becoming of practical service in dealing with the chief differences of opinion upon matters of fact; for the most effective source of fallacy and dispute is always the failure to get our meanings clear, and the subtler the misinterpretation the more effective it is.

But if we resolve to think of the assertion as that which the sentence attempts (or intends) to express, rather than as that which the sentence does express, we leave a way open for the effort to search for real meanings behind apparent ones in any actual case that comes in question. The point at which to stop asking for the real meaning cannot be taught to us by any general rule, but at least we may avoid assuming a general rule to the opposite effect,—a downright prohibition of the most useful course that can be taken in any inquiry into difficult truth,—on the ground that this is to go outside Logic. It goes direct to the centre of all that Logic exists for the sake of doing. The doctrines that it transcends are those of Grammar, — generalisations about the forms of speech which are accepted as correct in a given age and country.

§ 4.—'Undeniable Truths'

But the harm of this false assumption does not end there. The confusion of sentence with assertion

directly encourages one of the most fatal defects of the traditional system, namely its attempt to base logical doctrines upon 'undeniable truths,' such as the so-called Laws of Thought.[1] Confusion between assertion and sentence tends to make us think too lightly of the difficulties of interpreting statements correctly; it tends to prevent our seeing that an undeniable truth is, after all, only expressible as a *statement*—a sentence—and that behind every sentence lies the question what precise interpretation is to be put upon it. When this is forgotten we slide easily into the habit of pinning our faith upon statements which, interpreted in one way, are rough and misleading generalisations, while interpreted in the only possible other way they are empty of meaning or value.

The constantly recurring difficulty with any general truth is to know exactly how to apply it, or what cases it covers and does not cover, or how far it professes to extend. If I assert that all Y are Z (for instance, that all excess of zeal is to be avoided) a legitimate doubt may often be felt as to the precise range of the assertion intended, the precise things or actual cases which are contemplated under the general name Y. Where Y is a technical term whose application is wholly unknown to us, the sentence conveys of course no meaning at all; and where we know broadly the class of cases intended by Y—where we can recognise the more obvious or strongly-marked cases, but are doubtful about the exact definition of the class—there a meaning is conveyed, but a meaning which suffers more or less acutely from the defect called vagueness. To this extent, at any rate, the

[1] See § 35.

meaning of any general statement is the same as its application.

Consider, for instance, a maxim which Jevons put forward as of fundamental importance to Logic,—that "whatever is true of a thing is true of its like"—and which he afterwards expanded into the statement that "so far as there exists sameness, identity, or likeness, what is true of one thing will be true of another."[1] The various alternative words used for 'like' show that Jevons was to some extent aware of difficulties of interpretation that might be raised, but the really fatal vagueness of the maxim seems to have entirely escaped his notice. Does it speak of things which appear alike or of things which really are alike; of things which closely resemble or of things which essentially resemble each other? Does it tell us that seemingly sufficient likeness is always really sufficient likeness to warrant a particular inference, or does it only state that really sufficient likeness is really sufficient likeness? We are left to choose whichever of these two opposed interpretations we prefer, though clearly it is only in the latter interpretation that the maxim can pretend to be an undeniable truth. Certainly no one would attempt to deny that a true analogy is a true analogy, or that an essential resemblance is an essential resemblance, or that *if* two things or classes are really (*i.e.* sufficiently) alike they really

[1] *Substitution of Similars*, p. 15. There are also other variations of statement in his writings. *E.g.* "Whatever is known of a term may be stated of its equal or equivalent" (*ibid.*); "In whatever relation a thing stands to a second thing, in the same relation it stands to the like or equivalent of that second thing" (*Principles of Science*, p. 21); and "Whatever is true of one term is true of any term which is stated to be the same in meaning as that term." This last expression (*Primer of Logic*, p. 73) has not the vagueness of the others, but in order to avoid evident absurdity it must be taken as a mere maxim of consistency in the use of language, and as having no reference to the course of Nature.

are so. But after all, the only purpose of any general rule is to be applied in particular cases, and how are we ever to apply such a rule as this? When the question is whether the likeness between two given cases is or is not sufficient to warrant our inferring about the one case something that we already take to be true of the other, we cannot assume that the sufficiency of the likeness is undeniable; or rather, it is only too easy to make this assumption, and that is the very thing that Logic should guard us against doing. In face of the question whether a supposed analogy is a sound one, we can get no help from the axiom when taken in the meaning which makes it undeniable; and the help we get from it in its other meaning is delusive. As a rule of inference, therefore, it tells us either a falsehood or nothing. In the former interpretation it leaves us asking the very question it professes to answer,—namely, *what* things are 'really alike,' or how any proposed argument from analogy is to be justified; in the latter interpretation it implies that we can never be deceived as to the extent of equivalence between any two things,—that no one, for instance, has ever accepted a bad half-crown by mistake. As a general statement it is only true when so interpreted as to leave its application to actual cases vague and dependent on further knowledge coming to hand. We can never say, except at a risk, that two actual things are 'equivalent,' and that *therefore* something true of the one is true of the other; their equivalence, in the sense required, is only proved after we have discovered in some other way exactly what is true of both.

The fault of this axiom is, then, that however enlightening it may seem at first, before its many

exceptions occur to us, there soon comes a time when we begin to recognise some of the ways in which it is misleading,—to admit (*e.g.*) the need of distinguishing between deceptive and trustworthy likeness, between vague general likeness and likeness for a particular purpose, and so on. Thenceforth it is only with very large modifications that we can accept so loose a principle as 'Whatever is true of a thing is true of its like'; we want to ask at once what sort of likeness, or likeness in what particular respects, is required for true analogy in the given case. Even if we retain the maxim in its original verbal form we at least add something to our first loose interpretation of it.

It is possible that some readers whose common sense is in a healthy condition will think this point unduly laboured. The excuse is not only that Jevons failed to see it, even in his large work on the *Principles of Science*, but that the same dilemma—"false or else devoid of meaning"—vitiates all the axioms which formal logicians regard as the rock on which their science is built, and tends to vitiate some of their less sweeping generalisations also. A further excuse is that, as we shall see further on,[1] certain subtler forms of this vacillation between untruth and truism are justifiable, and that therefore the line between the good and the bad use of it is far from easy to draw; so much so, indeed, that both the plainest common sense and the most pretentious philosophy sometimes mistake the one for the other. It may therefore repay us to consider the question at some length, in the hope of making clear at least some of the reasons why Logic is so prone to fall into empty verbiage.

[1] §§ 6 and 50.

A good introduction to this ancient and far-reaching field of controversy may be got by considering first the general aim of science and the kind of problem it normally has to face. Though the opposition between scientific and common knowledge has enough reality and value to ensure its being exaggerated in our careless moments, we may take for granted that every one when he thinks about the matter will admit that it is not a thoroughgoing opposition. In the first place, the only conceivable aim of any kind of knowledge, whether common or scientific, is the power of dealing with concrete facts through 'wisdom before the event,' — the power of prediction from causes to effects. This does not mean, of course, that we can never recognise a truth without at the same time having a view of its future practical uses, but only that we all instinctively assume that truth is something which sooner or later has a practical value, even if in a given case we may have to wait an indefinite time before we discover what possible use the piece of truth will serve. Theories — generalisations — are our instruments of prediction; and we all know from experience that apparently detached facts, for which no immediate use can be found, nevertheless are constantly helping to mould our theories, and thus in the end affect our practice. So accustomed are we to this experience that we can be quite content to accept a truth 'for its own sake,' leaving to our successors the task of developing its applications. And thus, without ever doubting that all truth is ultimately practical, we can also appreciate the mathematician's famous epigram—"Thank heaven, *that* is a truth which no one will ever be able to

use." The question, which may be verbally asked, what we should do in the case of a statement miraculously known to be both perfectly true and perfectly useless, is like the question what would happen if a perfectly immovable body were to encounter an absolutely irresistible force. There does not appear to be any likelihood of the case arising, since whatever miraculous knowledge we may possess never extends to the possible future uses of a truth which now seems unpractical; such truths are merely stored away to bide their time.

§ 5.—Half-Truths

Not only are common knowledge and scientific knowledge alike in their aim, but as a mere historical fact the latter is a development of the former. Scientific knowledge has its roots in common knowledge, and to the end retains some traces of its lowly origin. It did not descend upon us from heaven fully grown, but has been evolved gradually by the same process by which our common knowledge ripens or clarifies itself even long before it has earned the right to be called scientific. On this account the normal work of science at any given time is the improvement of the half-truths that previous (or less scientific) science has reached.

By a half-truth is not here meant a statement containing exactly fifty per cent of error, but a statement (especially a generalisation,—a statement of general rule) which is only roughly true; a general rule which, as interpreted and applied, is true in some or even in most of its applications but not in all,—no matter what may be the relative number of

the true and the false applications respectively. Such half-truths—rough or approximate generalisations—are of course exceedingly common in all departments of knowledge of the way things happen, whether called scientific knowledge or not. They form in fact the broad leading ideas we have about the world we live in, the first vague conceptions by means of which we learn; and the conflict between those who are content to leave them uncorrected and those who wish to correct them is everlasting. Outside science, common proverbs are perhaps the most strongly-marked instance of the class. A proverb is seldom or never outrageously false, and yet it is often no more than a one-sided expression of a truth which can plainly be seen to have two sides, or at least to pass lightly over exceptions. For example, the rule "Take care of the pence and the pounds will take care of themselves" is evidently not quite true without exception, since another piece of proverbial wisdom reminds us that a ship may be lost through a niggardly use of tar. Or again, "Where there's a will there's a way" is not the whole truth of the matter, since a man may have the best will in the world to add a cubit to his stature and not be able to do it. And so with most of our proverbs; if we take any half-truth as perfectly true it may by accident lead us either right or wrong on a given occasion. The theoretical and practical knowledge it gives is the reverse of accurate. So far as the single occasion is concerned, such knowledge may mislead us, however great its statistical value. Whether the rule is extremely loose, like the rule that a red sky in the morning predicts a storm, or nearly true, like the rule that if you post a

letter it will be duly delivered, its inaccuracy may be as disastrous to any particular inference we have drawn from it. Even if there be only one unknown exception to a rule, the given case may be that one exception, and there is small consolation in the fact that the error was natural.

This kind of inaccuracy, so obvious in the case of common proverbs and other rough rules, becomes of course less easy to see the higher we rise in the scale of careful or scientific generalisation. And—what is not so widely recognised—it there becomes on that very account more troublesome. When the looseness of a rule or maxim is clearly seen, its power to mislead is usually remembered and discounted; we are then content to take it somewhat freely and trust to a vague and happy-go-lucky discretion to keep us from pressing it to unpractical lengths. We retain the verbal form of the maxim, but every one puts his own interpretation on it when a question of applying it arises; experience teaches us that current phrases often have to be taken with a grain of salt. And the method works fairly well so long as its unscientific character is clearly recognised, though it sometimes causes friction where the rules in question are of much importance,—for instance, where they are rules of morality rather than of merely sensible conduct. The more important it is to have some kind of definite rule to follow, the greater becomes the temptation to preserve any long-established formula even when the contrast between what it expressly says and what it is taken to mean has become a source of strife and confusion. Still, we need not question the fact that this way of dealing with half-truths has a value in some cases. Over a great part of life—and especially

where action is hurried or where (as in manners and morals) several different half-truths compete for acceptance—this is often the most convenient way of letting our knowledge grow. At the cost of a little vagueness we are saved at least from anarchy, and it is questionable whether in some of these cases science could give us any better results.

But it is precisely where science has a clear field of action—where time is not pressing and where emotion does not greatly interfere—that a different treatment of half-truths is demanded. From the point of view of science the method of free imaginative interpretation is too unconscious and too ill-regulated; and it fails to store up the advances of our knowledge in a readily available form. So far as science can be contrasted with common knowledge, its aim is to state general rules so that their correct interpretation shall not depend upon individual genius, or upon skill and discretion in effecting happy compromises, but upon the kind of care which is open to every one to practise,—care spent in taking technical statements exactly in their literal sense. Science therefore cannot be content with rules which are stated so as to ignore their exceptions, but it must always be trying to recognise the exceptions expressly.[1] Thus the defects in the statement of a scientific generalisation are in two ways vitally important: on the one hand they are smaller defects, and therefore less obvious, and therefore more effectively misleading, than those which disfigure the rules of common sense; and on the other hand science is more interested in

[1] In this connection it is interesting to remember that Darwin is said (*Life*, vol. i. p. 148) to have had "the power of never letting exceptions pass unnoticed. Every one notices a fact as an exception when it is striking or frequent, but he had a special instinct for arresting an exception."

getting its statements as verbally correct as possible. That is in fact the essential characteristic of its aim, the characteristic on which its existence as distinct from common sense depends. Its rules, like all rules, are intended for application in particular cases, but its special business is so to state them that they may be taken literally, applied in their whole extent, and still found true.

The aim itself is intelligible, and well known. But equally intelligible, if less familiar, is the fact that scientific generalisations normally do not quite achieve it. Leaving Mathematics out of account for the moment, and leaving also out of account the few cases where all the world is at present agreed in finding no fault with a rule as stated, it must be confessed that the greater part of what claims to be scientific knowledge is in a less unassailable condition. Actual science is mainly a battlefield of competing theories built on a limited but increasing knowledge of facts. The chief spectacle presented by science is that of unfinished inquiry, of unstable knowledge, knowledge which is nowadays somewhat consciously unstable. Whatever the ideal may be, the actual work of science mostly consists not in contemplating its own perfections but in removing little by little its own discovered imperfections; not in deducing absolutely certain truths from undeniable principles but in constant revision of both facts and theories in the effort to make them harmonise. And until the discovery of new facts, and of new light on old facts, comes to an end, this growth and partial reorganisation of scientific knowledge bids fair to continue. Indeed we cannot even imagine the growth of knowledge ending for lack of new material to gather and

of old errors to correct. So far as can be seen, at any conceivable period of the development of human knowledge, our existing generalisations will be grosser than the facts, and will bear refining further whenever the need arises. There will thus always be room for the detection of the untruth that remains embedded in accepted 'truths.'

So radical a conflict between ideal aim and actual performance naturally leads to some difficult situations. Our desire to make our statements accurate, and the limitations of our power of doing so, together constitute a peculiar source of danger; namely that we shall be drawn into defending the literal accuracy of a statement by desperate means, among the easiest of which is the trick of turning it into an undeniable truth by mere definition of its terms, thus making it beg the question it professes to answer. Any statement, if it claims to be important, tends also to claim literal accuracy; and, as we noticed above, the special business of science is to make this claim more seriously than it is made in expressing our looser common knowledge. On this account, therefore, science is under special temptations[1] to force its statements to be true by deliberately making them *abstract.*

§ 6.—'Abstract' Statements

The technical term 'abstract' is always contrasted with 'concrete,' but as the latter word is equally technical this is only an empty explanation. A better

[1] It is not here meant that the attempt to defend verbal accuracy at all costs is exclusively a scientific failing. From the Delphic oracles down to the latest platitudes of political controversy, men have always been prone to hedge their statements so that their literal accuracy should be secured. But we may here leave out of account all the meaner causes of the practice, such as stupidity, or personal vanity and *Rechthaberei.* None of these violent explanations are needed in the case of science, whether ancient or modern.

short account of it would be that, as applied to any kind of knowledge or assertion, 'abstract' means *vague*.[1] A general assertion suffers from abstractness in so far as we fail to see exactly how to apply it in concrete cases. But though this short account is true as far as it goes, it does not carry us far. For one thing, it seems to regard abstractness purely as an evil, and does not attempt to explain what justification there may be for its existence anywhere,—a question the discussion of which belongs to a later place[2] in our scheme. At present it may suffice to notice that assertions which suffer to some extent from abstractness are a necessary incident of all progress in knowledge. At any rate it is clear that, as things are, we are often obliged to be content with statements which have some nucleus of truth in them but also a fringe of doubt and error; where we are only on our way towards the discovery how far precisely the truth extends. If this slight taint of abstractness were rigidly ruled inadmissible—if the process of feeling our way towards a satisfactory generalisation were to be condemned altogether—we could never get forward a step in any concrete science. It is only through finding our generalisations vague, and then continually raising the question what cases precisely the general names refer to, that our knowledge of general truths has any chance of growing.

But the fact that a certain amount of abstractness in generalisations is a necessary evil, and at the same time a necessary condition of intellectual activity, is

[1] Of course the word abstract does not itself *mean* 'vague'; rather, it means 'artificially simplified,'—simplified by leaving certain considerations out of account, or neglecting a part of a concrete whole. But abstractness of assertion, in so far as it is a defect, is the same defect which is otherwise called vagueness.

[2] See pp. 219 ff.

not what specially concerns us here. For the moment, what we are considering is the status of *perfectly* abstract truths, truths which are guarded against criticism by being made tautological. Since every half-truth, as such, is true in some of its applications, we can always render it wholly true—if this kind of 'truth' is worth having—by restricting its meaning so as to make it refer to those applications only, without saying which they are. The half-truth, for example, that likeness warrants inference by analogy can (as we saw in § 4) be turned into an undeniable truth by explaining that 'likeness' here means only *sufficient* or *essential* likeness,—an explanation which leaves unanswered the question how to apply the rule in cases of likeness not yet known to warrant the analogy in question. Such a statement leaves unanswered the very question it pretends to answer.

And so with all our statements of 'tendency,' or of what would happen in the absence of counteracting circumstances. Either they must be willing to confess their applicability in the concrete, and thus to stand some definite test, and thus be open to question; or else they are nothing but a meaningless form of words. For instance it is undeniable that in the absence of counteracting circumstances every man would live for ever, but if the general statement that all men are immortal were defended on the ground that it speaks only of man in the abstract,—man considered apart from the counteracting circumstances which in fact surround him,—how could such a statement be either applied or tested? Similarly, water in the abstract (H_2O) is undeniably pure water, and yet the statement that all water is pure would be either false or meaningless. In examples of this

kind, no doubt the absurdity of the defence is evident, but it naturally becomes less so where the half-truth defended is more nearly true.[1]

The emptiness of purely abstract truths is hidden from us mainly by our bad logical habits, among which two are chiefly to blame,—the confusion between assertion and sentence[2] already mentioned, and the inclination to take Mathematics as the type of science in general. In Geometry, for instance, as every one knows, we have statements which are apparently quite abstract and yet are as full of meaning as any assertion can be. A point or a line is defined so as to preclude the possibility of there being any such thing in the concrete world. No visible point is small enough to satisfy the definition, and none would be small enough even if our visual power were increased to any specified extent. And the same with the breadth, or with the straightness, of a line. So that when it is said that any two sides of a triangle are together greater than the third side, or that a bent line is longer than a straight line between the same two points, the assertion, *strictly taken*, is perfectly abstract.

But, as a matter of fact, are geometrical axioms ever quite strictly taken? At any rate it is clear that wherever they are applied the strict interpretation of them would be irrelevant. Just because any actual lines and angles are not the ideal thing but only an approximation to it, therefore the principles by which we judge of their quantitative relations to each other must either speak of approximations or

[1] Some examples which cannot here be quoted concisely enough are noticed by Mr. Knox in *Mind* for January 1900.

[2] *I.e.* the inclination to assume that if a sentence has the form of an assertion it must also have the reality. And see further p. 86 below.

else be irrelevant. The applicable meaning of these axioms lies therefore not in their strictly abstract interpretation but in something else; their function as rules of inference depends on the fact that they hold true when interpreted as comparative statements about concrete cases. Any statement, for instance, about the properties of a straight line or a circle would be devoid of application if it could only be applied to these unrealised perfections; but it happens to be also proportionately applicable to actual lines or figures in so far as they approach straightness or circularity. The rule that a straight line is the shortest distance between two points need not be taken as saying anything more than that of any two lines drawn between two points the one which is straighter will also be shorter. It is in this sense that we apply it whenever we take a short cut across a corner. In the same way the axiom that things which are equal to the same thing are equal to one another may be applied to approximately equal things by comparison with others which are further removed from equality. That fact, and not the purely abstract truth, is the justification for our common rough use of any weights or measures.

Turning, however, from statements of quantity to those of quality, we find on the whole that this way of interpreting a purely abstract statement cannot be employed except at great risk. Quality differs from quantity in the fact that simple measurement applied to it can only help us quite irregularly and uncertainly in predicting comparative effects. This holds good to some extent even of well-known and easily-tested qualities like heat and cold, but much more so when the qualities in question are—as most

qualities are—of a vaguer or more complicated kind. Compare, for instance, Jevons' axiom about likeness with the one just quoted about equality. The statement that whatever is true of a thing is true of its like cannot be safely applied to cases of approximate likeness; a detected false coin, however nearly it resembles a real one, is totally condemned. Likeness is a quality which does not admit of simple numerical measurement, since likeness or unlikeness in one small detail may for a given purpose outweigh unlikeness or likeness in any number of others. The never-ending problem of qualitative science is to find out more completely what is the precise importance of this or that point of likeness or unlikeness between any two things or events. To count them all equal for every purpose—to adopt the principle 'One point of likeness, one vote'—is to be as unscientific as possible.

Here then is at least one reason why it will not do to take Mathematics as the type of science in general. By so doing we obscure the distinction between generalisations which, interpreted as comparative, can be trusted without reserve, and those which are merely working hypotheses or half-truths, demanding continual improvement through their application in concrete cases in order to note exceptions carefully. The attempt to make such generalisations undeniable by definition is an attempt to end by main force the wholesome and instructive conflict between theory and fact, through which all our knowledge of Nature has grown and is growing; and its result is to give us formulas which, interpreted in one sense, are half-truths uncriticised, while, interpreted so as to guard them against all criticism, they are

meaningless; formulas which produce a false security and serve as a mental narcotic. Of course if we could remember consistently that they are abstract then there would be no harm in them, as well as no good. But we cannot consistently preserve this attitude towards a general statement. We cannot help assuming that a general rule is something which has to be applied in particular cases, even though when hard pressed to defend its accuracy we seek the spurious safety of an abstract interpretation. Thus Mr. Bradley's well-intentioned remark that "we never at any time wish to use tautologies"[1] needs some expansion. It is true perhaps that we do not love tautology for its own sake, but as a means to an end some of us are only too ready to use it on occasion. The purely abstract interpretation of a general statement is usually an afterthought. It is when we find a maxim false in its obvious interpretation, and are afraid to admit its falsity, that we take refuge in the interpretation that makes it true but futile. It is in the effort to evade criticism that the meaning of the maxim is limited until it reaches the vanishing-point and thus ceases to be an assertion.

And the confusion of assertion with sentence naturally helps to support this shifty practice. The habit of taking the sentence as *being* the assertion, instead of as being merely the outer shell or husk of it,—merely that through which the assertion is more or less doubtfully revealed,—must tend to make us assume that a sentence which looks assertive really is so. No doubt the identification of sentence with assertion is never carried quite to the extreme; every one would allow that two distinct sentences may

[1] *Principles of Logic*, p. 131. See also *Mind*, 1894, p. 340.

express the same assertion, and no one would claim that the sentence (*e.g.*) 'Nothing exists' has any meaning. But it does interfere with our seeing that where we take a sentence which expresses a general assertion only partly true, and then in order to escape criticism so define its terms as to make its denial nonsensical, the assertion is lost and only the sentence remains. The sentence 'All Y are Z' (*e.g.* 'Luxury is to be condemned') gets what assertive force it has from our power of recognising this, that, and the other case as Y (*e.g.* this or that expense as luxurious). But if in answer to the question what Y means in this sentence we can only say that we mean by it those cases of apparent Y which really are Z, then by that act of definition we have deprived the sentence of every shred of its assertive meaning, and turned it into a postulate about the word Y. Yet the *sentence* is there unharmed, and the more we tend to confuse sentence with assertion the less can we see that the assertion has disappeared. The consequence is that the exceptions to the half-truth that 'All Y are Z' tend to remain unnoticed; our knowledge of the extent to which that generalisation may be trusted cannot progress; and in our anxiety to get certainty in place of half-truth—and to get it as simply and cheaply as possible—we have palmed off upon ourselves a sham assertion.

The attempt to use this kind of refuge against criticism is not, of course, always made openly and definitely. The commoner forms of it are subtler and less extreme. They are often to be met with in long-established fields of controversy, for example where difference of opinion exists about religion or politics or conduct. Whenever (*e.g.*) we find a particular form

of religion defended on the ground that 'irreligion' is fatal; or a political party defended on the ground that some abstract virtue, such as order or progress, is valuable; or a phrase like "all property is theft" defended on the ground that the existing industrial system is in some respects unfair to the proletariat; or a particular line of conduct condemned on the ground that "we ought not to do evil that good may come," or defended on the ground that "a man must act according to his lights"; in all such cases we have an opportunity of observing a half-truth preparing to take refuge in this manner from the critical attack. The purpose, however instinctive, is to entice the critic's attention away from the question whether these vague general truths are here *applied* correctly, and to pretend that their *truth* is in dispute. Not only proverbs, but accepted verbal formulas of any sort have an applicable meaning which is partly true and partly false. No one of them is raised above all danger of misapplication. It is difficult, no doubt, to see our own religious or political creed as a mere half-truth, but not impossible if we think of the majority of those who honestly profess to hold it. Any creed, taken in some sense in which it is not understood by its adherents may, of course, be the perfection of wisdom; but taken as it is in practice understood it is always imperfectly true. And so far as we succeed in hiding its imperfections by mere abstract definition, it is as if we were to argue that Thames water is pure because water is nothing but H_2O, or because all water is pure in the absence of counteracting circumstances. Of course pure water is pure water, and virtue is virtue, and true analogy is true analogy. But how do these

statements bear upon any questions that can be at issue? When recognised as truisms they are wholly inoperative; when confused with doctrines their effect is to hide from us the imperfections of our actual doctrine, and so to check the gradual development of loose half-truths into something better. The defender, let us grant, wants to preserve the formula intact for the sake of the truth that is in it. But to preserve it quite intact, in its applicable meaning, is beyond the power of any one in face of criticism. So he gives it an inapplicable meaning, for a refuge in times of attack. The trick is too often effective. In the general ignorance of Logic which prevails, and which is fostered by the traditional teaching system, it is not difficult to make people accept a circular truism as a deep philosophical truth.

§ 7.—The Purpose of Technical Terms

In addition to the slippery or ghost-like nature of undeniable truths, there is a further reason why the notion of progress suits Logic better than the notion of perfect axiomatic certainty; namely the fact that while a mathematical doctrine, once apprehended, is never afterwards found misleading, exactly the reverse is the case with our logical doctrines. When knowledge of Logic is identified with knowledge of the difference between good and bad reasoning, it is evident that any person's logical training is a gradual growth, the beginnings of which are lost in the mists of memory. Our recognition of the truths (or supposed truths) of Logic does not begin only when we begin to study the books, or attempt to express the truths in technical language. Just as we form a vague notion of the nature and aim of Logic

long before we care to inquire closely into its details, so our notion of the difference between good and bad reasoning is gathered at first in an irregular accidental manner, and grows clearer and fuller with the growth of our experience of reasoned beliefs and their value. A Logic of some sort every one has, if only a few vague ideas more or less relevant to the main problem. At a very early age the ordinary child,[1] among civilised nations, makes some acquaintance with the misleading or puzzling power of language, and so begins to reflect in a desultory manner upon the tricks that words are apt to play upon our thought; and probably every such child by the time he is ten years old has already acquired a scrappy collection of logical half-truths which influence his judgment. As we grow older we modify these and extend them, but as far back as we can remember we have always had some views, of a sort, about the snares of reasoning. It is not the *facts* of reasoning which are recondite, but rather the truth about those facts,—the subtle analogies between facts that seem different and the subtle differences between facts that seem alike. In some other sciences the facts are often hard to come at, and any new discovery may bring much illumination with it. But in Logic almost every fact is trite and familiar, and the illumination of them is the difficult work required. For instance,

[1] In a chapter entitled "The Little Linguist," in Prof. Sully's *Studies of Childhood*, some interesting instances are given, one of the children being only about two and a half years old, and others above four and five. The author remarks, "There is nothing more instructive in this connection than the talk of children themselves about words. They build up quaint speculations about meanings, and try their hand bravely at definitions. . . . There is something of this same desire to get behind words in children's word-play, as we call it, their discovery of odd affinities in verbal sounds, and their punning. Though no doubt this contains a genuine element of childish fun, it betokens a more serious trait also, an interest in word-sounds as such, and a curiosity about their origin and purpose."

one of the commonest problems for the logician is to take a couple of apparently contradictory logical doctrines[1] each of which appeals to us as true, and to place them in some light which shall remove the contradiction. In the less perplexed and less careful mind of the common-sense reasoner these truths—like pairs of conflicting proverbs—may lie comfortably side by side; but the logician is specially under obligations first to see and then to reconcile the contradictions. For him there is less chance of easy contentment with truths which stultify each other.

Thus we are never quite without logical doctrines, but we begin with vague and confused ones and gradually make them less vague, gradually find out how through their vagueness they become misleading when applied to actual pieces of argument. After the very first steps are taken, therefore,—at a date to which our memories will not carry us back,—to learn the truths of Logic is always to correct some that were held before; to modify over-simple rules so as to allow for their exceptions. Therefore our logical education consists from first to last in the attempt to rectify half-truths, to express them with precision; and since this is an endless problem our knowledge of the technicalities also—the instruments of precise expression—must be progressive rather than final.

Technical terms, as we all know, require to have their meaning carefully fixed, and this is done by means of what everybody calls definition. On the other hand many people have not clearly recognised the fact that it is only in the attempt to become

[1] *E.g.* the doctrine that ambiguity absolutely destroys meaning, and the doctrine that a small amount of ambiguity is harmless. See chap. vii.

accurate that our statements have any need to become technical; or that technical terms exist only for the purpose of expressing doctrines precisely, and are not in themselves or apart from this purpose things with a value. The textbooks, for reasons noticed above, encourage the view that definitions of the technical terms are to be learnt as isolated facts preliminary to the rest of the science, just as Euclid's definitions may be learnt once for all. But this plan helps to obscure the fact that when you have so learnt them you are only at the beginning of the difficulty which is always troubling Logic, and which never troubles Geometry,—the difficulty of using your definition to tell you precisely how some doctrine shall be interpreted in particular cases. It thus tends to prevent our seeing that an extension of our knowledge of particular cases is always liable to modify the definitions with which we had previously been contented. The traditional view of the matter—the view adopted in the text-books—is based upon our loose popular notions of the nature and use of definition, notions which confuse under that name many different operations. As a matter of fact there are several purposes of definition, several different reasons why we may want a word's meaning stated; and among these a broad division into two main kinds should always be kept in view. Sometimes in asking for a definition we want to know in general what is the meaning of a word, how it is used or how it ought to be used in most of its possible contexts,—for instance, what is the most widely accepted meaning, or the most convenient meaning for general purposes, or the meaning accepted by the best authorities, or the meaning most historically accurate, most prominent at the time

when the word was first invented or adopted. Sometimes, on the other hand, none of these questions are asked, but the questioner's whole desire is to discover how the word is used in some assertion where he finds it ambiguous, and so to get the ambiguity removed. Both these processes are commonly called definition, and the information we get in answer to either kind of question has a certain value. But there is a real difficulty in remembering—what is evident enough when we think about it—that an answer which is valuable for the former purpose may have (on a particular occasion) not the smallest value for the latter. The 'general' definition may give you no hint as to the way in which a particular assertion is meant to be interpreted. You may know the general meaning of a word and still find it ambiguous in a particular context, and then of course the best possible definition of the former kind may only give you stale information and do nothing towards removing your difficulty.

For example, take the statement that explosive bullets are forbidden in civilised warfare. About the general meaning of the word 'explosive' there is not much doubt or difficulty; and the rule against the use of such bullets is therefore fairly well understood. But now imagine that a doubt has arisen whether some new kind of expanding bullet comes under the term 'explosive' as here intended; then our knowledge of the meaning of the rule is destroyed so far as that particular case is concerned, as long as the doubt continues. Here is a new invention which acts in somewhat the same way as an explosive bullet of the more undeniable kind, and yet differs from it in certain respects. Is the resemblance im-

portant enough to make us class this kind of bullet as explosive, and so enlarge the old meaning of that term as here employed; or is the difference so important that the resemblance need not count? In questions of this kind we often find opinion strongly divided—more persistently, perhaps, than anywhere else. We think we have a clear idea of the meaning of a given word, and then some day our knowledge of particular cases is enlarged and we find the meaning not so clear as we thought. The consequence is that we fail to understand clearly some assertion in which the word occurs. A new invention, or a new discovery of fact, cannot avoid raising some perplexities of this kind, and as long as novelty is to be expected in the facts we have to name, our existing definitions will be unstable. Wherever progress of knowledge is possible our definitions are liable to revision and change. The first European who discovered a black swan was placed in this dilemma.

New inventions or discoveries are, however, not the only ways in which knowledge may grow, and they have specially little to do with the growth of our knowledge of Logic. That, as we have just noticed (p. 40), consists scarcely at all in the finding of new facts hitherto inaccessible, like the black swans of Australia or the irrigation works on Mars, but in achieving a more and more precise expression of general truths which are in a sense familiar and yet are too loosely conceived,—general truths, too, the whole purpose of which is to be applied in particular cases, and which apart from such application would have no meaning. The technicalities of Logic are needed to express the doctrines of Logic, and the definitions are needed in order that we may

understand the doctrines enough to apply them even in difficult cases, and so to recognise any exceptions there may be. In settling, either way, the question of definition we at the same time increase our knowledge of the rule's limit of value in application.

From the inquirer's point of view, then, the object of studying the technicalities of Logic is not merely to make some acquaintance with the formulas and definitions that are widely accepted, or that have been invented or defended by this or that writer, or school of philosophy. So far as any such object remains in view at all, it becomes of secondary importance, and our primary aim is to study the technicalities in relation to the truths they can be used to express. These truths (or half-truths) themselves are the real centre of logical interest, and the technical terms are only the machinery proposed for expressing them with the greatest attainable precision, —machinery which is itself open to improvement and therefore open to criticism in its details. Where a doctrine, confronted with a doubtful case, is found to lack precision, we have our choice between two courses,—to amend the doctrine by noticing the case as an exception, or to amend the definition so as to make it include the case. Just as the rule that explosive bullets are forbidden may work quite smoothly till a new kind of bullet comes in question, and then calls for amendment in one of these two ways, so with every generalisation of Logic. To make a step forward is always to find ourselves called upon to decide whether we shall amend a previously accepted rule by registering an exception, or on the other hand amend a previously accepted definition by extending it. Whichever course we

adopt we make the rule less vague; we gain an increased understanding of its precise meaning and value.

It is of course only in the attempt to make our logical views more and more scientific that we get drawn into these questions about the accurate interpretation of a general rule. If we could be content to think of Logic as merely a group of rough maxims about reasoning, analogous to the maxims of conduct to be found in a copybook, then no doubt we might learn the abstract definitions by heart, and so have done with them. A phrase like "Evil communications corrupt good manners" carries a rough meaning even though we do not inquire very precisely what communications have a false appearance of evil. But a logician, if he cares about his business, cannot remain so easily content with vague generalisations. He feels bound to take more trouble with the doctrines of his special science. He cannot pretend that there is any reason for the existence of Logic, as contrasted with mere common sense, if its own rules are left to be interpreted in haphazard fashion; indeed the technicalities also would then become unnecessary, for there is evidently no particular merit in using a pompous term to express merely the same vague idea that the man in the street expresses in simpler language. Only a sort of fair-weather Logic can be made of such materials,—a Logic which is applicable where no doubt or difference of opinion has arisen, but which breaks down exactly at the point where the demand for careful method begins. That is why the logician eventually gets drawn into the problems of accurate interpretation of general rules in special cases; is it not better

that he should do this willingly and with open eyes, rather than be led into the difficulties by accident and then flounder into worse confusion in the effort to ignore them?[1] Real difficulties will not allow themselves to be concealed for ever, and especially not in the name of science.

§ 8.—Definition and Translation

This view of the way in which technicalities should be studied may be more easily kept in mind by means of the distinction noticed above between the two main kinds of 'definition,'—that which gives a general account of the meaning of a word and that which gives an account of it with reference to some particular assertion in which it occurs. And for the purpose of keeping this distinction clear the student will often find it useful to call the former kind of definitions *translations*, so as to emphasise the fact of their liability to fail in removing a particular

[1] A favourite way of seeking to rule these inquiries out of court is through the attempt to regard Logic as having no special interest in the distinction between good and bad reasoning, and so to get rid of the practical aspect of the science altogether. But some of the writers who incline to recommend this attitude do not restrict themselves to it in their own works, and the better their work is the less can they do so. Even if the central problem were stated as the study of the nature of reasoning, still that would involve a study of the difference between more and less rational reasoning as its foundation. Similarly, a study of "the relations of propositions to one another" must base itself on discrimination of the true relations from the merely apparent. The recommendation to avoid all connection with practice seems to be made partly in order to guard beginners against a possible disappointment, and partly through some fear of the science becoming degraded. But the word *practical* need not always be taken in its most uncomplimentary sense, and when it is not so taken the dislike of practical considerations becomes an excuse for indolent abstractness of theory. A system of Logic wholly unrelated to actual difficulties of reasoning might escape the charge of being practical, but if it were called theoretical it would degrade that word also. Besides, there is no doubt that Logic, like all other sciences, has always been very closely bound up with the needs of practice, if not entirely called into existence by them. A Logic which quite consistently avoided attempts to discriminate between good and bad reasonings would be unlike any that has yet been written.

difficulty of application. A general definition, just because it is general, must inevitably leave some particular difficulties untouched. A general definition suffers, like all other general assertions, from the defect of abstractness.

The name 'translation' seems appropriate for the following reasons. If we consider the various ways in which the meaning of any word can be verbally explained, three main types stand out with some clearness. At the lower end of the scale, where explanation is at its vaguest, there is the kind of statement that a dictionary gives,—the translation of a word into more familiar language, as when 'ambiguity' is explained as 'double meaning'; or even a mere hint of what is intended, as when 'ammonite' is explained as 'a kind of fossil shell.' At the other end of the scale, where explanation is most precise and definite, there is the process of discussion by which a special difficulty of application (an 'ambiguity'[1]) is dealt with after it has arisen. And between the two extreme types come the better kind of generally-useful definitions, which have evidently something in common with both ends of the scale. In face of a particular difficulty of application which they foresee and remove, they make good their claim to be called definitions; in face of a particular difficulty which they do not foresee and remove, they become, for the time, analogous to translations. For then they do no more than alter the verbal form of the question which states the difficulty, and so may be said to translate the word rather than to define it. They give an answer which, while pretending to be

[1] The reasons for this account of the nature of ambiguity are given chiefly in §§ 43-48.

relevant, only raises the old difficulty under another name. If, for instance, you want the word 'luxury' defined in order to apply in some doubtful case the rule that luxury is to be avoided, it is no use to be told that luxuries are the opposite of necessaries. That answer leaves your difficulty exactly where it was, though it gives you another verbal expression as equivalent to 'luxury'; and perhaps you knew as much before. We noticed the same thing, at p. 30, in the case of the words abstract and concrete.

The turning-point of the distinction here intended, then, is that a translation is not wanted except when the word to be translated is unfamiliar, while a definition is not wanted except when the rough meaning of the word is already known,—and only then if an actual difficulty is felt in applying the word correctly in a given case or cases. The desire for a translation is the desire for a provisional explanation to enable a start to be made in raising further inquiries; the desire for a definition is itself the raising of the further inquiries which are only possible when a translation is already possessed. Having thus drawn the distinction we may use the word 'translation' rather than 'definition' either when we have to complain that a given attempt to define a word does not meet a particular difficulty which is raised, or again when we are stating a definition which does not claim to be more than generally useful, or useful for the purpose of conveying a rough notion of the meaning to a person to whom the word, or some technical usage of it, is unfamiliar. For the beginner, to whom the technicalities of a science are as strange as words in a foreign language, it is often necessary to give the

merely general definitions first, and as long as he is sufficiently warned against supposing them to be more than roughly applicable no harm is likely to be done.

§ 9.—Can a Progressive Logic be Taught?

Our conception of the general aim and method of logical study may now be briefly summarised as follows. The one purpose of Logic, whether it be called a practical or a theoretical purpose, is to obtain insight into the difference between good and bad reasoning; but since this is necessarily a gradual and progressive achievement, and since it is not possible to fix the date at which we first begin to obtain such insight, the actual work of the student of Logic, at any stage of his progress, consists in improving his existing views little by little, rather than in making a sudden leap[1] from ignorance to knowledge, still less in learning 'truths' which, if interpreted in the only sense in which they can seriously claim to be true, either answer no question or else beg the questions they are supposed to answer. And since such improvements involve changes in the conception and expression of doctrines, questions as to the precise meaning of the technical terms which are used to express them must constantly arise, — questions analogous to that about the quasi-explosive bullets, or to the question whether a bicycle is or is not a

[1] No doubt the same applies, strictly speaking, to progress in any department of natural science. But in many sciences the step from popular to scientific knowledge is much more abrupt than in Logic, since reasoning is a more universal practice than reasoning about a particular group of facts such as those considered (*e.g.*) in Botany or Chemistry. One may contentedly disclaim all knowledge of a limited special branch of inquiry, but we cannot so contentedly disclaim all knowledge of that which underlies every science equally—the distinction between good and bad reasoning. Inevitably we all know something about it.

'carriage' within the meaning of the Act. It should never be forgotten that technical terms only justify their existence when they are seen as instruments for expressing general rules with accuracy.

Our reasoned acceptance of these views will of course depend a good deal upon the fuller meaning we give them,—upon the details and corollaries they are meant to include. And a first corollary from them is that Logic must always be to some extent at war with its own earlier stages. The logician, in so far as he attempts to be scientific, is constantly finding previous or existing doctrines a little too slack and easy, his special business being to guard against cheapness of logical doctrine, against attempts to hide real difficulties under vague language, against any delusive simplification of the work that has to be done. We shall find it instructive, therefore, in discussing any particular logical doctrine, to make this element in it the centre of interest. And though there is room for endless subtlety in doing so, there is also at present an obvious need for some elementary criticism. When the grosser defects of our traditional Logic have become more widely recognised than is now the case, then the same method will no doubt be used with beneficial effect against our own results.

This consideration—that the improvement of Logic is an everlasting process and may be made as gradual as we please—allows us to hope that the general view here taken is not, after all, incapable of adaptation to the wants of the beginner. The difficulty of doing it I should be the first to admit, but we need not assume it to be a hopeless undertaking. In some respects indeed our method will be found easier than the

traditional one, at least by readers of an inquiring turn of mind. Such readers always find a great deal of self-contradiction and needless perplexity in the traditional system, faults which may be traced to a few avoidable sources.[1] Again, the inquiring mind is inclined to be suspicious in the presence of technicalities for which no use is apparent, and the traditional Logic is grievously overburdened with these; it has retained accretions of them, through centuries of changing philosophy and growing science, without much attempt to discriminate between the dead and the living notions which they imply. As an exercise for the memory[2] they may be useful, but to those who want to get forward in knowledge of Logic many of them are now no more than obstacles and sources of error. Our method leaves these dead and useless technicalities aside without the least compunction. The simplest rule is that no technicality shall be considered worth discussing unless it supplies an already felt need in expressing a doctrine, and further, that no doctrine shall be put forward for acceptance without at the same time attempting to show its purpose and application,—especially to show the plausible errors which it counteracts.

The apparent defect of a system of growing truth, from the teacher's point of view, is its lack of rigidity, of curtness, and of confident certainty. Teachers are fond of reminding us that the beginner, even when he is really seeking for knowledge and not merely submitting to be crammed, wants his

[1] For a general summary of these, see chap. xii.

[2] Of course many of them have also a historical interest, but that aspect of them is naturally never shown to the beginner. Indeed, to do so would be not only to unsettle his faith in their present importance, but to introduce him to greater difficulties than any here proposed.

knowledge in a downright form; not vague hints of an elusive truth which is never quite satisfactory, but plain statements which he can trust and remember and apply. So he does, no doubt; but that hardly seems to be an argument for giving him statements the plainness of which is perplexity disguised and the matter of which is either false or wholly absent. There is another way of giving him what he legitimately wants. If we at first restrict him to negative doctrines—*i.e.* to those which point out that such and such accepted views are in need of certain corrections—we can get plenty of them which are capable of fairly plain statement and simple application with the best results. Since the beginner's mind is not a blank sheet of paper in regard to logical knowledge, but a storehouse of vague and erroneous generalisations, the process of learning Logic is for him in the first place a process of unlearning things he has taken for true.

The first two parts of this book will therefore contain an examination of various common-sense and traditional views about the use of words in assertion and reasoning, and will make an attempt to show the more important errors in them, to notice the point at which each of them breaks down and becomes misleading. In this way the student will not only have something to take hold of at once, but will also find that the attempt to rectify his views on these subjects may later lead him just as far as he chooses to go into the depths of philosophy. There is no pressing need to go to the end; in fact no one has ever done so, and yet mankind thrives and progresses in knowledge. But at every step of the way something is gained. For the harm of "a little knowledge" does

not consist in its being little but in its being taken for more than it is worth. On our plan this danger is specially fought against from the beginning. There is here no attempt to put into the hands of inexperienced young people a perfect system by which they can test all the arguments they meet with and see at once which are sound and which fallacious; the only attempt worth making is that of directing and helping forward the natural process of gradually gaining insight into this difficult distinction. The student may be safely warned from the first that Logic is not a subject to be learnt and done with, but a life-long study as endless as any other branch of science. He may safely be warned from the first that there is no such thing as 'logical proof' in the sense of finally conclusive proof, or as sharply contrasted with inferior kinds; but that in all reasoning about matters of fact the most we can do is to guard against those sources of error which our previous experience—illumined by our Logic—may have brought to our notice. A little knowledge of this kind can hardly be called a dangerous thing.

And another somewhat similar truth should also be of use to the beginner. He must not suppose that the cautious and minute inquiries of Logic, or of science generally, are always appropriate when an opinion has to be formed. The chief occasion on which they lose their value is when there is need for hurry, or rather wherever time is of more importance than minute accuracy. Since everyday life is full of such occasions it is well to remember that the study of Logic is not the only valuable mental training. It cannot, for instance, be of much use in warfare or in business affairs generally. By keeping this warn-

ing in view we may avoid the special harm which belongs to the sceptical habit of mind,—excessive indecision or slowness in reaching conclusions. It is quite possible to distinguish sufficiently in practice between questions which need a prompt answer approximately correct and those in which we may be content with a never-ending search for greater accuracy and fulness. We are not always compelled to hold a strong opinion prematurely.

Some warning should also be given against the natural supposition that in studying Logic we are learning how to conduct a controversy. Indirectly, but only quite indirectly, knowledge of Logic may be useful for this purpose; but the art of disputing or convincing depends on many other things as well, and (so far as it can be studied at all) deserves a separate treatment, with the purely logical element in it reduced to small dimensions. This subject receives some attention in American colleges,[1] but has not yet, I believe, become a branch of academic instruction in England; and obviously it has the special kind of difficulty that belongs to an art, so far as an art can be contrasted with a science. Skilful oratory, or even effective argument, needs a richer combination of qualities than is demanded for the study of the use of words in reasoning, or indeed for any philosophical work. Such useful controversial virtues, for instance, as moderation and self-control evidently cannot be acquired by the mere study of Logic, however laboured. They come to us rather by character, and experience, and partly through a sense of humour.

[1] Of books intended for this purpose the only one I happen to know is *The Principles of Argumentation* by Prof. Baker of Harvard.

What value, then, remains for Logic, and why should any one care to study it? That is easily answered if we admit that there are any occasions on which it is worth while to know more about the difference between good and bad reasoning than our unaided common sense can tell us; for it is exactly on these occasions, and on no others, that Logic is wanted. If there is any one who would deny that such occasions ever occur, he would also deny the practical value of Logic. Most people, however, know at least that the case does arise occasionally, even though they fail to recognise its frequency and importance. That recognition can only come by degrees, but it is certain to come to those who will make any attempt to study Logic as a progressive science, and it is certain to grow steadily stronger the further they push the inquiry. The function of Logic is to help common sense in cases where (time being available for deliberation) common sense comes to a difficulty, a doubt, or a difference of opinion which it wants removed; and these cases are anything but rare. Indeed they are far too common, and the more telling objection against accepted theories of the difference between good and bad reasoning is not that they are a mere intellectual luxury or plaything, or a kind of knowledge seldom wanted, but that face to face with the enormous mass of difference of opinion which exists even where neither passion nor hurry is a disturbing factor, our best Logic is as yet so limited in its power of dealing with it. On this ground alone there is always a crying need for common sense to improve its logical views. And the improvement cannot even be begun until we admit their unfinished, pro-

gressive character. We must recognise that at any period their defect is essentially that which attaches to a rule of thumb, or to any generalisation which, because it is only roughly true, is found to be too rigid for satisfactory application to the real difficulties of reasoning.

CHAPTER II

REASONING AND SYLLOGISM

§ 10.—Reflective and Forward Reasoning

'Reasoning' is a word which scarcely needs translation, and which (as we shall have to confess in chap. iv.) is extremely difficult to define. But we may leave the difficulties of its definition aside for the present and attempt to get a general view of the nature of the process in cases where no one would be likely to raise any doubts as to their being examples of reasoning rather than of 'instinct,' or of 'unreasoned judgment.'

One small difficulty should however be mentioned, since it belongs merely to the translation. There are in common use two different senses of the word,—different and yet so closely connected that confusion often results. 'Reasoning' may mean arguing (with oneself or with others) about the truth of a given assertion, or on the other hand it may mean using an already accepted truth as a stepping-stone to some further truth less obvious. That is to say, both the reflective movement of thought which seeks to dispute or justify a conclusion already formed, and the forward movement of thought which seeks to reach a new conclusion, are constantly included and confused

under the vague term reasoning or inference.[1] The confusion is a natural one and yet avoidable. It is partly due to the fact that reflection enters so largely into the forward movement itself. As will be seen in chap. iv., it is far from certain that there is any judgment[2] from which reflection is entirely absent. And, however this be settled, at any rate reflection obviously enters into a large number of our judgments in the very process of their formation,—namely into all those where we really care about judging correctly and are not compelled to judge in too great a hurry. This aspect of reasoning has therefore a special interest for Logic, and in the present chapter we shall confine attention to it exclusively; we shall here think of reasoning purely as a reflective process, where an assertion is on its trial and reasons are given for accepting or rejecting it. While forward reasoning starts from facts accepted as true, and asks what unseen conclusion they point to, reflective reasoning starts from a questioned conclusion and examines its truth by exploring its grounds.

§ 11.—How Conclusions are Supported

What do we all know about this operation, without the aid of a technical Logic? It is familiar to us from childhood, and we can scarcely avoid some knowledge of it. We know, for instance, that to question the truth of a conclusion is to call for facts

[1] Through failing to avoid this confusion we might easily reach the paradox that reasoning involves two incompatible things,—novelty, and the absence of novelty, in the conclusion. See an article by Miss Jones in *Mind* for April 1898.

[2] The word 'judgment' may often conveniently be used instead of 'assertion,' where we want to speak of the assertion as accepted by oneself instead of as made to an audience. On any occasion when a difference is recognised between a judgment and an assertion, the former means 'the assertion, *expressed or not*,' and the latter 'the judgment expressed.'

on which it may rest, and that to support a conclusion is to produce such facts. We know also that after the facts are produced they may still be open to objection on one of two grounds; we may dispute their truth, or we may dispute their relevance,—their sufficiency (even if true) to prove the conclusion. And whichever line of objection is adopted a new question is thereby raised, which takes precedence of the question originally in dispute. Till this new question is answered the argument is at a standstill; and, notoriously, the end of an argument may take a long time to reach, for one question only too often leads to another. The original question depends upon a second question, and that may in turn depend on a third, and so on until we either give up the argument in despair or accept the new light which our opponent has been trying to give us. Again, we all know something about what constitutes the relevance or sufficiency of an accepted fact to prove a conclusion; and something also of what is involved in the claim that a fact is 'true.' More or less vaguely we know—though we often cannot express the knowledge in any satisfactory general language—that to recognise given facts as relevant to given conclusions is the same thing as to recognise principles and general rules, especially rules about the way things happen in Nature, — rules of 'causation' or of 'causal sequence,' as they are sometimes called. For instance, the rising and falling barometer is taken to be a relevant fact in weather prediction just in so far as we believe in general rules connecting these variations with particular kinds of weather; if we hold that the rules are vague and liable to exceptions we see at once that the use of them in a special case is uncer-

tain, while if we are contemplating some rule without exceptions—like 'any two sides of a triangle are together greater than the third side'—then no such difficulty in its application arises. And we constantly act on the assumption that the remedy for vagueness in our general rules is to look for the causation behind them, as far as we can,—to see, for instance, *why* the falling barometer and the coming storm are connected facts; for that is always a help to us in seeing what the exceptions to the rule are likely to be. Thus (when once the point at issue is clear) argument between two persons, or difference of opinion as to the soundness of a piece of attempted proof, is generally found to turn upon some difference of view as to the way things happen in Nature, and the consequent meaning of this or that fact,—the precise interpretation that ought to be put upon it. The more complete our general knowledge is, the more we are able to 'take facts for what they are worth' and so to avoid putting a wrong construction upon them.

§ 12.—The Syllogistic Framework

At least so much, I think, is fairly well known to most people before they begin the technical study of Logic. And part of the business of Logic is to make this somewhat vague knowledge more definite and consistent. Its earliest answer to the problem survives almost unaltered in the traditional doctrine of the Syllogism, which involves the supposition that every assertion, regarded as disputable, requires for its proof two others related to it in a particular manner and accepted as true. These are called respectively the 'major premiss' and the 'minor premiss'; the

assertion supposed to be proved by them is called the 'conclusion'; and the three assertions together form a 'syllogism.' The particular relation required between the premisses and the conclusion may be seen with the help of the old typical[1] instance: *Socrates is mortal* (conclusion) for *he is a man* (minor premiss), and *all men are mortal* (major premiss). Keeping this instance in view we see that reflective 'syllogising' consists in showing the conclusion as a particular case coming under a general rule. In the typical syllogism the statement of the general rule is the major premiss, and the function of the minor premiss is to connect the conclusion with it.

Now we may admit from the first that the simpler an argument is the more easily can this elementary conception be applied to it. For instance, suppose that in order to prove that the lines AB and AC are equal you bring forward the fact that they are radii of the same circle. Then it is plain that the relevance of this fact depends on the assumption of the general rule that all radii of the same circle are equal. Here we have an extreme case of simplicity in an argument; the fact brought forward is remarkably definite, and is at once connected with a familiar generalisation which exactly covers the assertion you wish to

[1] The traditional Logic, while recognising this form as typical, introduces a number of verbal complications through identifying the sentence with the assertion and so recognising differences which are merely of form, and not of meaning. These are irrelevant to anything we have here to say about the Syllogism, and may be entirely dismissed from our thoughts. Even Formal Logic admits that the value of the syllogistic process stands or falls by that of its typical form.

As noticed in last chapter (p. 11), logicians have a convenient custom of still further typifying (or generalising) arguments by using letters instead of words; for instance, the letters XYZ or the letters SMP. Thus the typical syllogism is often written: 'S is P; for S is M, and all M are P.' Here S and P stand for Subject and Predicate of the conclusion, and M for 'middle term.' The nature of the middle term will appear as we proceed. For first mention of it, see *note*, p. 66.

prove. The result is a plain straightforward syllogism, of which the fact produced is the minor premiss, and the major premiss is the rule which is clearly implied in producing that fact for the purpose.

But arguments in general—and especially those that are less easily settled—are seldom capable of being reduced so readily to the direct syllogistic form, except at a risk of misrepresentation. We need not here dwell on the notoriously common difficulty of settling precisely what the disputed conclusion is,—since that may be regarded rather as a preliminary to reflective reasoning than as a part of the process itself. We may imagine a clear point at issue raised, and consider what the special difficulty is that has still to be surmounted before the argument as a whole can be viewed as a syllogism.

A distinctive feature of the kind of arguments we are here speaking of—the arguments which are less easily settled—is that they do not turn upon the truth and relevance of a single fact, but upon the truth and combined relevance of many. This is only a loose way of expressing the difference, since—as we shall presently have opportunities of seeing—it is by no means an easy question what facts, if any, are really single or simple. But the looseness of the expression does no harm so long as we take it as meaning only that *recognised complexity* in the 'fact produced'—*i.e.* in the minor premiss—is the distinguishing feature of this kind of argument; for it is evidently a verbal accident whether we speak of such minor premiss as stating one complex fact or a number of simpler ones; our choice of one or the other of these two expressions being chiefly a question of convenience, of using language so as not to strain it

pedantically or without sufficient excuse. What is meant is that the truth of the conclusion in such cases cannot be satisfactorily made to turn on some one straightforward concise statement of fact, like "they are radii of the same circle," or on some one easily performed experiment which gives a clear and conclusive answer; but it involves the separation of a condensed and obscure statement into a number of details covered by it, or a weighing of many facts one against another and a somewhat risky estimate of the total balance.

We must all admit, I think, that there are arguments of this nature. In deep and persistently controversial subjects of discussion we are always meeting with them. But they are to be found also, if we care to find them, in more everyday questions,—at least where there is a desire for accuracy, and time to consider the question fairly. For instance, even in such a common matter as weather prediction it is evident that the usual simplicity of the reasoning depends on our usual indifference. When it is only a question whether to take an umbrella or not, we may rap the barometer and follow its advice; while if we have the safety of ships or harvests at stake we go to work more carefully,—we collect a large number of separate details and put them together in the form of a chart in the daily papers. And the interested fisherman or farmer goes a step further and observes for himself a number of details in the appearance of his local sky and the sequence of its changes, the direction and fluctuation of the wind, and in short as many other signs as he believes in. The end of the process of collecting relevant details is wherever we choose to stop.

Now the question is how arguments of this kind are to be explained as cases of syllogism. Imagine the difficulty of finding a major premiss to fit such a complicated 'fact' as even the present state of the local weather conditions,—finding any one general rule which shall exactly cover this particular case in all its details. I do not mean only the grammatical or literary difficulty of framing the sentence required to express it,[1] but the deeper difficulty of obtaining any more credence for it than for the conclusion itself. An appeal to a major premiss in support of a doubtful conclusion assumes, of course, that the truth of the major premiss is easier to admit than that of the conclusion; the appeal is made to our stored-up knowledge, and its effectiveness for the purpose depends on the ease with which we can recognise the major premiss as an already admitted truth,—like "all men are mortal," or "all radii of the same circle are equal." But this effect is lost if the major premiss comes at all under suspicion of having been manufactured on the spot in order to fit a special observed conjunction of facts. The more complex or numerous these are the more unlikely it is that the precise *total* conjunction has ever before been met with, and the more impossible it becomes therefore to view the generalisation about it as part of our stored-up knowledge. The weather-rules that we do (with reserva-

[1] There are many forms of argument whose apparent unlikeness to syllogisms is due to the difficulty of expressing their major premisses in a shape which our grammatical sense of decency can abide. See, for instance, the first five of the eight types noted by Mr. Bradley in his *Principles of Logic*, p. 226. Thus, however unbearable may be the sentence (*ibid.* p. 227), "A body is to the right of that which that which it is to the right of is to the right of," no one who has the patience to struggle with its interpretation would dispute its truth. Such principles are habitually used without attempting to shock the grammarian by expressing them in 'logical form'; their truth is too obvious to make the literary problem of expressing them worth the trouble of solving.

tions) believe in are all of a vaguer, broader, simpler kind. Parts of the total fact may fit into some of them, but the fact as a whole cannot be seen as a particular case of any single general rule.

This analysis of an argument into its component parts—this breaking up of a syllogism into syllogistic fragments—is the only known method of examining the truth of a conclusion which professes to rest upon stated reasons. Both carelessness and genius may dispense with it, and so jump to conclusions, but if we wish to know in the case of a given conclusion what part has been played in it by carelessness and genius respectively, we must pull the reasoning to pieces and look at its separate threads; and this is not always an easy operation. In the example just referred to the complexity is of a kind that stares us in the face, but that it cannot always be so plainly seen is proved by the fact that in the course of such analysis we often discover the need for carrying it further than we at first expected; the limits we set to the analysis are dependent on the state of our existing knowledge, which is capable of growth; and wherever we set the limit we claim to have got down to facts which may safely be taken for simple. It is precisely in this claim that the chief danger of faulty reasoning resides. A concealed complexity in the fact appealed to as evidence is the root of the defect technically called 'ambiguity of the middle term,'[1]—that last infirmity to which even the most apparently

[1] The analysis of propositions into terms is a matter which need not here be considered, though something is said about it in §§ 30, 57, and 60. Meanwhile it is enough to know that the 'middle term' of a syllogism is that part of the two premisses which connects them with each other. And since the relation between the two premisses is always that of rule and application (see also *note*, p. 72) it follows that the account given of the fact relied upon as evidence is always the middle term wherever the process can be regarded as a syllogism at all.

faultless syllogisms are liable. In an argument where the complexity of the minor premiss is so easily seen that neither party attempts to view the process as a single syllogism this chief danger of faulty reasoning does not arise, for everyone then knows that much remains to be done before proof or disproof is reached. To admit that you have only partly solved a complex question is to reserve judgment, to recognise that your conclusion—if you incline to one at all—is tentative and open to revision. Far otherwise is it however with the separate parts into which you have resolved the total question; for there you have got pieces of argument resting on facts which, from the nature of the case, you regard as simple,—simple enough, at least, to be taken as wholes without discoverable risk of error.

§ 13.—Verbal Simplicity of the Middle Term

It is in our habit of viewing facts which admit of being concisely described, as simple facts, that the danger chiefly resides; and the convenience—amounting in some cases to little short of necessity—which justifies this habit merely increases its effective misleading power. No one, perhaps, would go so far as to say that every fact describable by a single name is a single fact rather than a group of facts, but our inclination to make this assumption tacitly is at least strong enough to cause considerable error. Our natural tendency, when our reflective power is weak or inexperienced, is to fall under the domination of words,—a tendency which may be observed both in the individual and in the human race. This superstitious attitude towards language

shows itself in many forms, but the one we are here concerned with is the inclination not to suspect a middle term of ambiguity. The particular case S is seen as M, and if we accept as true the statement that all M are P, we consider it proved that S is P. If we can connect two premisses by a middle term which, being a single word or a concise expression, looks simple, our easy-going childish or mediæval Logic is satisfied. We do not, at first, look behind words to the precise details they are meant to cover, and so we tend to overlook differences in meaning between the middle term as used in the two premisses respectively. And thus one of the chief sources of false ideas about the Syllogism is the supposition that 'logical proof' (or syllogistic demonstration) gives certainty,—in the sense that by finding a pair of accepted premisses from which your conclusion is logically deducible you can force an opponent to admit it, under pain of becoming a sort of logical outcast. Logical outcasts there may indeed be, but your opponent does not become one by merely admitting a pair of sentences while refusing to admit a conclusion that 'logically follows' from them; what would make him an outcast would be his shirking the question what the ambiguity is that stands in his way. His legitimate position is, "I admit that *in a sense* M is P, and S is M; but not in the sense in which they support your conclusion"; and it is only if he wishes to run away after saying this that he can properly be accused of shuffling. If he believes his objection justified he will naturally stay and explain it.

The concealment of real complexity under verbal simplicity is one of the most ubiquitous and familiar

facts of language. Language is full of comprehensive words and phrases intended to mask and obliterate unimportant details and refer to an underlying unity; and such words may perform their function of hiding details just as completely when the details are important as when they are not so. Take a word like *man*, or a phrase like *radius of a circle*. Socrates is not 'man' in the abstract, but a concrete individual; only it happens that none of his individual peculiarities are of the smallest account as against the rule that man is mortal. And radii of a circle differ infinitely in direction, but since it is clear that their direction does not affect their length we proceed with confidence to recognise the equality of any two of them. On the other hand let us imagine the details of the present weather conditions summed up in the phrase that the sky 'looks threatening,' and we find at once a suspicious kind of vagueness in the description. By using a comprehensive phrase we have simplified our major premiss, but in this instance every one can see that it is a purely artificial simplification and possibly delusive. Evidently there may be different conceptions of a 'threatening' sky, and your conception of it may not be exactly the one that the major premiss requires. The question whether it is so resolves itself inevitably into a search among the details, and then the apparent simplicity stands revealed as real complication.

Everywhere in estimating the importance or meaning of a fact—that is to say, its relevance to a given conclusion—the question confronts us whether such fact has been far enough analysed into its details; for of course the weight of the whole fact is only another name for the combined weight of the details,

pro and *con;* and so far as any of these are left out of sight, risk of error enters into our judgment. In the examples just referred to, the trouble would probably not arise; they were chosen as well-marked instances, first of legitimate and secondly of questionable obliteration of details by means of a middle term; in the former kind there is no risk to speak of, and in the latter the risk is too obvious to be effective. But evidently between the two extremes there must be a region of cases less easily classed as safe or unsafe. And these are the cases that have special interest for scientific Logic, since the error in them, if error there be, is well concealed.

The importance of these cases may be conceded, but what about their extent, their frequency of occurrence? That is a difficult question to answer shortly, but I hope that in the following chapters we shall find some truths that bear upon it. The difficulty is to see any reason, other than merely accidental,—such as the wish to save time or trouble,—for putting a limit to the process of looking behind words to the details they obscure and obliterate. Even without attempting to push the inquiry far, a little reflection shows at least that this misleading power of words has a much wider range of action than common sense is at first inclined to expect. What *is* a 'single' fact, when we come to consider the question? A fact with a single name,—a fact expressible in a short sentence? That superstition we have just seen cannot seriously be defended. We may rather ask whether any fact has any other singleness than this nominal or artificial kind. Possibly we shall find reasons for holding that every 'single' fact is single only so long as we choose to consider it so; that in all conception of concrete facts there are

more and less deniable portions; and that the essence of scientific proof consists in making the best approach to a clear separation of the true and the doubtful portions in any fact conceived as supporting a conclusion.

For the moment, let us anticipate this inquiry, and see what follows from such a view of the nature of facts in general. One evident consequence is that the correct reduction of arguments to the syllogistic form must be difficult not only where the plurality of the facts is easily visible, but exactly as difficult in other cases, and for the same reason. In all cases, without exception, the same difficulty in fitting the major premiss to the minor must be *liable* to arise,—the difficulty which we noticed in the case of the weather-signs. Of course there are unnumbered cases where (rightly or wrongly) it does not actually arise; and if we keep in view only the reasonings of Euclid, or arguments about Socrates and his mortality, we may never discover the need for raising it. It is not in easily settled arguments that ambiguity of the middle term becomes a practical danger, nor in arguments that are evidently vague. But if facts are never single except in name, then there is no descriptive word which is perfectly safe against this kind of confusion, and those that seem safest may be on that very account the most effectually deceitful.

§ 14.—Uses of the Syllogism

Is the Syllogism, then, a wholly useless piece of logical lumber, like so many other of the old technicalities? Not altogether. The elaborate syllogistic apparatus provided by the traditional Logic is no

doubt, wordy and trivial to the last degree; and even if we discard this and keep only the framework and the leading idea, it is a conception which cannot be safely applied to actual arguments except by the help of experience and discretion. Nevertheless the truth that is in it deserves to be recognised, and, when the proper precautions are taken, may perhaps be found not entirely useless.

The leading idea of the Syllogism, as we noticed at p. 62 above, is the recognition that where any fact is produced as sufficient to prove a conclusion, the sufficiency of such fact for such purpose depends on the acceptance of a generalisation which covers it and connects it with the conclusion.[1] No doubt this is an

[1] It should be noted that there are some arguments in Fig. 3 which do not come at all naturally under this conception, though they can be forced under it by 'reduction.' (See for instance Mr. Bradley's example vii. in *Principles of Logic*, p. 226. The function of Fig. 3 is to prove 'particular propositions,'—which (see § 58 below) are sentence-forms commonly used to express the *denial of a generalisation*, rather than a predication about a Subject. Thus 'Some S are not P' is more commonly intended as a bare denial of 'All S are P' than as a predication about 'Some S.' For vague and negative conclusions of this kind the essential requisite is the production of at least one instance which contradicts the generalisation (*e.g.* 'M is not P, and M is S'). Of course the whole of M must be outside P in order to get the required connection through the middle term; but since it makes no difference whether M is a class or an individual case, it seems a straining of language to regard the major premiss in these cases as necessarily a statement of general rule.

And the so-called equational syllogisms are another kind that do not come easily under the conception of rule and application; the reason being that the sign = is expressly intended to mean something different from the ordinary copula. No doubt 'A=B' might conceivably mean 'A is so far like the recognised members of the class B that it may be reckoned among them'; but as a matter of fact Jevons and others have always professed to mean by it either 'The same identical thing (or class) may be called indifferently either A or B,' or else 'The two things A and B are identical in some particular respect'—*e.g.* length, weight, etc. Under either of these two latter interpretations there is no reason why we should regard the propositions 'B=C' and 'A=B' as major and minor premisses respectively. Taken together, they form a minor premiss for use with the major premiss. 'Things which are equal to the same thing are equal to one another.'

Prof. Croom Robertson long ago pointed out (*Mind*, vol. i. p. 211) Jevons' exaggerated view of the importance of these 'simple identities,' and the confusion which follows upon his attempt to distinguish between them and equations of the form 'A = AB.' If the sign = were consistently taken to

extremely elementary truth, and it would be difficult to find the exact point in the development of any young child's reasoning powers at which he first began to take it for granted, though unable to give it verbal expression in a general form. It is, in fact, only a corollary from our instinctive belief in causation,—from our belief, that is, that all particular cases come under general rules. Whether expressed or not, and whatever phraseology be used for expressing it, this belief is part of the constitution of any mind that forms a judgment about concrete affairs.[1] Not only our differences of creed or formula but even the widest possible differences of belief about the ultimate foundations of Nature fail to affect it; at most they affect our guesses what precisely the general rules may be. For instance, some people hold it to be a trustworthy general rule that spirit-rapping is nonsense, or that sticks cannot be changed into serpents, or pumpkins into coaches, while others think that all such rules need qualification to allow for wonders and miracles. But a miracle itself requires for every mind, however unscientific, some unity behind it,—some law under which it takes place, —whether this be conceived as a hitherto unknown law of Nature, or as the will of God, or as the pleasure of fairies. There is no escape from the abstract

mean, after all, the same as the old copula 'is,' then there would be no good reason for describing as 'equational' any syllogism so expressed, and they would come under the Aristotelian conception; if on the other hand it be taken strictly as Jevons claimed to intend it, then it covers only those comparatively few and unimportant reasonings which have for their major premiss the axiom above quoted. The defects of this axiom when it is extended to take in similarity (or even 'equivalence') we have already noticed sufficiently in §§ 4 and 6.

[1] I do not dispute Prof. Ward's view (*Naturalism and Agnosticism*, vol. ii. p. 232) that there would be no *absurdity* in its denial; but that does not seem to carry the consequence that we are ever, in fact, without the belief, nor do I understand him to mean this.

syllogistic framework in which all our activity of mind is confined; however far we develop our Logic we cannot outgrow our early acceptance of the axiom that every particular case has a general rule behind it, and the corollary that proof consists in finding a general rule to cover the particular case. The effect of our efforts to make our Logic more scientific is not to deny this elementary truth but only to introduce more care in its application to given arguments.

If Logic had no particular interest in disputed conclusions, but only in those admitting of the unanswerable demonstration that Euclid gives, we might rest satisfied with this fundamentally simple account of the nature of reasoning. We are, however, inevitably led beyond it if we are asking for the difference between good and bad reasoning not only in cases where every one can see the defect with a few minutes' attention, but also in cases where doubts persist or recur, where strongly-held views conflict with each other, and where accordingly real difficulties have to be surmounted; those questions, in short, which call for something more intelligent than mere mechanical rules and more effective than rough-and-ready common sense, to relieve the tension or to clear up some of the fog. From this point of view the syllogistic account of reasoning is interesting mainly as helping to show the point at which the more subtle kinds of error creep into an argument,—namely the middle term. The conception of arguments as syllogisms has thus an entirely different function from that which the textbooks would lead one to suppose. Instead of supplying us with a model to which all our arguments ought as much as possible to conform, it reminds us of the danger to which our arguments

are liable just in proportion to their appearance of conforming to the simple syllogistic type; what we learn by means of it is how to find the vital point of an argument, the point at which to look for the sources of possible error, especially when they are difficult to find. When once the meaning of the conclusion is agreed upon, then the only possible fault in an argument is that of an over-simplified middle[1] term, a middle term which under some too concise verbal expression obscures the real complexity of the fact relied upon as sufficient for proof, and thus produces an ambiguity,—a wandering to and fro between two senses in which that term may be taken.

We see, then, why the attempt to force all arguments into the simple syllogistic mould breaks down. If it is done without regard to possible ambiguities of the middle term, then the misleading power of the syllogistic conception is great in proportion to the real complication and difficulty of the reasoning; while as soon as Logic does begin to take ambiguities into account the simplicity of the major premiss disappears in a cloud of fragments, and we no longer have anything resembling a simple syllogism. The syllogistic conception is in fact only applicable so far as we have general rules which can be absolutely trusted; and these are not only rare, but the few that there are belong essentially to the un-

[1] It should be noticed that while the old doctrine of the Syllogism gives no more than a formal warning against ambiguity, it sometimes (but not always) applies this warning impartially to all the terms in the syllogism and not to the middle term only. This is no doubt due to its pre-occupation with the problem of drawing conclusions from given premisses, rather than finding premisses for a given conclusion. (See end of this section.) In reflective reasoning, however, we start from the conclusion, having first agreed upon its meaning; and then ambiguity is only possible in the middle term.

disputed and the stagnant parts of our knowledge, like the propositions of Euclid and the conclusion that Socrates is mortal. Wherever knowledge is growing—and that is nearly everywhere—it does not run to stringent and satisfactory major premisses but to glimpses of causation seen with increasing insight into their endless complexity of detail.

The syllogistic conception may also be of use in another way. It is often worth while to take an argument as a simple syllogism merely for the preliminary purpose of discovering what general views are really held by the person who thinks the facts produced are sufficient to prove the conclusion. The nature of this operation may best be seen by contrasting it with a closely similar device more commonly used in disputation; namely where, by taking the statement of fact with a bare literalness never intended by the assertor, his opponent makes it appear to involve a major premiss which is plainly absurd. This is a forensic or debating-society trick of a rather trivial kind, and like all tricks it argues some weakness in the case that employs it, but an example of it may help to remind us of its commonness and to show the kind of effect it too often produces. The following[1] is a passage said to have occurred in Lord Erskine's cross-examination of a witness, William Hay, in the trial of Lord George Gordon :—

> The witness said that in the city he saw 'the very same man carrying the very same flag he had seen in the fields. He said he knew it was the same man because 'he looked like a brewer's servant.' '*Like a brewer's servant!* What, were they not all in their Sunday clothes?' 'Oh, yes, they were all in

[1] Quoted from Mr. Baker's *Principles of Argumentation.*

their Sunday clothes.' 'Was the man with the flag then alone in the dress of his trade?' 'No.' 'Then how do you know he was a brewer's servant?' Poor Mr. Hay! . . . At last, after a hesitation which everybody thought would have ended in his running out of court, he said he knew him to be a brewer's servant 'because there was something peculiar in the cut of his coat, the cut of his breeches, and the cut of his stockings!' . . . 'I am sure, gentlemen, you will not forget, whenever you see a man about whose apparel there is *anything peculiar*, to set him down for a brewer's servant.'

Though this instance is so extreme as to be almost farcical, it serves to illustrate the way in which the underlying generalisation may be unfairly simplified till it becomes absurd. The fact that there is 'something peculiar' about a man's clothes,—or even, more particularly, about his coat, breeches, and stockings,—is obviously not sufficient evidence that he is a brewer's servant; and yet we should all admit that a more specified peculiarity of dress might be sufficient, and that the fault of the witness (supposing him honest) probably consisted not in his assuming the absurd generalisation which is here trickily ascribed to him, but merely in his failing to specify sufficiently the peculiarities he had actually noticed. There is nothing absurd in using peculiarities of dress as signs in this manner, and nothing unusual in failing to give a clear account of them afterwards. We can often distinguish between kinds of things that are nearly alike—*e.g.* between Englishmen and Americans in Paris—far more easily than we can mention precisely the points of difference seen. Besides, as a rule we fall short even of our own best power of description. Through hurry or idleness, or through the wish to avoid saying unnecessary things, our account of a fact is usually

scantier than we might have made it; in describing anything we habitually take some risk of being misunderstood.[1]

The legal argument just quoted certainly has the appearance of a mere rhetorical trick. But the same method is often used even without intentional sophistry, and then we can only suppose that the arguer has learnt his logic from the textbooks and has failed to study actual arguments with intelligent observation of their strength and weakness. Such observation does not indeed put an end to the method of unduly simplifying the generalisation, yet wholly transforms its character. It ceases to be a trick, and becomes a useful artifice. It ceases to aim at a closure, and merely raises a further inquiry, thus becoming one of the chief instruments of the fairest possible logic. Instead of making, with Lord Erskine, a triumphant appeal to the audience to find the reasoning absurd, you may use the simplified generalisation to make a direct appeal to the witness to attempt a further specification of details in order to explain what he means. Instead of considering the inquiry finished and the conclusion disproved, you may carry the inquiry on from this point by assuming that the fact so vaguely and baldly stated (*e.g.* "something peculiar") is really a more relevant fact than it seems when pinned down to its bare expression. "But you *don't* mean to imply that

[1] Where De Morgan (*Formal Logic*, p. 20) remarks that "the honest witness who said, 'I always thought him a respectable man,—he kept his gig,' would probably not have admitted in direct terms 'every man who keeps a gig must be respectable,'" we should rather say that the witness would probably not even tacitly imagine that any such rule could be taken as free from exceptions. The same applies to another example quoted by De Morgan: "his imbecility of character might have been inferred from his proneness to favourites; for all weak princes have this failing."

all M are P" is a common form into which this inquiry runs, its purpose being to force a clearer statement of what the implied generalisations really are. Faulty generalisations are often forced to lose some of their plausibility in becoming less vague and tacit; but even where no such result follows this is usually the best line of inquiry if you wish to get at the speaker's true meaning, and so to approach the question how far a stated fact is sufficient to prove a given conclusion.

The task of finding the precise generalisations which are involved in bringing forward a fact as relevant is nearly always difficult, if we desire to do it with fairness. It is difficult even to know them as they exist in our own minds, and naturally still more so when the mind that entertains them is not our own, and we have only another person's vague elliptical statements to guide us in the search. The search for them is necessarily a tentative process. No mechanical[1] rule, such as the old doctrine of the Syllogism provides, can do more than suggest a line of inquiry; it does not settle the question except in cases so simple that we can hardly conceive a dispute arising. The aim of reflective reasoning is to trace doubts and differences of opinion to their source, and the more simple and straightforward we assume this difficult problem to be, the more crude and unsatisfactory will be our efforts to solve it. For if an argument is really simple, then common sense is

[1] The truly mechanical nature of the Syllogism when sentence and assertion are confused is evident from the fact that Jevons constructed a wooden machine for getting conclusions from premisses with perfect accuracy. We need not go so far as to say, in Mr. Spencer's words (*Principles of Psychology*, vol. ii. p. 90) that such processes have "nothing to do with thought at all," but at any rate they have little to do with subtle errors in reflective reasoning. The only complexity they deal with is of an open and innocent kind.

sufficient for the occasion and careful Logic is not called for, while if it is only apparently simple it is even more deceitful than where its complexity stares us in the face. That is the dilemma: the appearance of simplicity cannot be trusted, and real simplicity (so far as such a thing can be said to exist) is only evidenced by the absence of dispute. So long as every one agrees about a given conclusion there is no more to be said about it, but the moment dispute arises we have a case where one party suspects the other of having been deceived by a false simplicity in the middle term.

As regards the use of the Syllogism not for reflective proof of a disputed conclusion, but for putting together given propositions as premisses and so reaching a new conclusion, that is of small importance except as providing exercises in Formal and Symbolic Logic. Faults in the 'reasoning process' so conceived belong, as we found in § 3, rather to the grammatical than the logical aspect of the syllogism; and the occasions on which we get premisses before we have an inkling of the conclusion are, besides, neither so frequent as Formal Logic supposes nor of a kind to conceal difficulty and so create effective error.[1]

§ 15.—Summary of the Chapter

In this chapter we have been solely occupied with the nature of reflective reasoning and with the kind of objections, and replies to objections, that constitute the framework of every argument about a proposed conclusion. We saw that the position of the objector to a conclusion is better conceived in

[1] For further remarks on this point, see § 62.

general as that of an inquirer than a scoffer, though there usually comes a point—too soon, if we are shallow logicians—where our inquiry is satisfied and we accept or reject the conclusion on its apparent merits. Reflective reasoning, we found, is the production of 'facts' as sufficient to support conclusions, the sufficiency being made up partly of the *truth* of the facts produced, and partly of their *relevance;* and we saw, further, that to recognise the relevance of a fact is the same thing as to recognise the truth of a general principle—a theory about the way in which certain facts are connected by natural law—so that any defects in our implied theories are at the same time defects in the relevance of our facts; defects which, of course, may or may not turn out on inquiry to be important.

Then we noticed how it is that these two elements in proof correspond exactly to the two premisses in the ancient conception of Syllogism; which conception, when it is freed from the dust raised by confusing sentences with assertions, stands out clearly as our recognition of law in Nature, our recognition that all particular cases come under general rules, and that consequently our reflective assurance that we understand correctly any particular case (the conclusion) depends on our power of fitting it, by means of a minor premiss, to the general rule to which it properly belongs. But we found two important difficulties in applying this conception to cases of argument, first, that in many cases there is evident complexity in the fact produced, necessitating a corresponding complexity in the major premiss, often sufficient to prevent such major premiss from appearing any better known than the conclusion

itself; and secondly, that even where there is an appearance of simplicity, and where accordingly we tend to view the process as syllogistic, the appearance may very well be deceptive,—the premisses may seem to be connected by the middle term and yet the connection may be faulty and the reasoning therefore false. Since these are the cases in which the error is most concealed they are of special interest to Logic.

A syllogism used for proof, then, is a judgment (the conclusion) expanded so that the two disputable elements in it shall lie open to inspection. In a reflective syllogism the premisses have no priority to the conclusion, but rather come out of it. And this view materially alters the notion of *proof* as popularly conceived. Following the old superstition, strict proof is popularly supposed to be 'mathematical demonstration'; and the defender of a shaky theory may still be found admitting with apparent candour that to supply mathematical demonstration of it is beyond his power. But in the light of the above account of the Syllogism such an admission becomes irrelevant; for the most that any proof can do, in the case of disputed conclusions, is to challenge the objector to find definite fault with the reasons given for belief. Sometimes the obvious fault is that a major premiss is wanting, sometimes that the minor premiss is untrue; but even where an apparently faultless syllogism is produced it is still quite possible that the middle term suffers from ambiguity. To offer proof is to offer definite points of attack, and there are many conclusions—in fact most of those which are worth discussing at all—where anything resembling mathematical demonstration would have an

effect as far removed as possible from being satisfactory. It would make the objector feel sure that there must be some ambiguity if he could only find it. When matters of real doubt and dispute arise, and continue, between any two parties of average men, it is extremely unlikely that a perfectly unambiguous syllogism can be found to support either side. Complex and difficult questions are not to be settled by merely guarding against the formal errors of demonstration. Any general rules laid down for the purpose are of necessity simple and obvious—except for their technical dress—and to suppose that our neighbours break them only through sheer ignorance or carelessness is just the kind of pharisaical assumption that can only keep Logic in evil repute. It is not the abstract principles of correct reasoning that are unfamiliar to the average man (except in their technical expression) but the limits of the safe application of those principles when the concrete subject-matter is taken into account.

It should now begin to be a little clearer what is meant by saying that ambiguity of the middle term of a syllogism is the root of all the most important kind of error in reflective reasoning. That statement is as far as possible from implying that arguments in general are best conceived as simple syllogisms. Indeed it reminds us that so to conceive any argument is precisely to ignore the risk of such ambiguity. The decision how far it can safely be ignored in a given case is one of the eternal difficulties in forming judgments correctly, as we shall see more in detail in Part II. But already we have got some glimpses of the nature and effects of ambiguity. Though we have left the

question open whether all statement of fact is over-simplified, we have seen the manner in which a false simplicity may on occasion be given to a fact by means of a general name, and that whenever this is the case the remedy lies in bringing to light more of the details that are covered by the wide and vague expression. In the hiding of these details the ambiguity of the middle term always consists. And in thus expanding the minor premiss we necessarily expand the major premiss also, until the attempt to regard it as a single simple generalisation of the type "All men are mortal" becomes impracticable or useless. The further we push the inquiry what details are comprised in the fact produced as relevant, the more we find that the argument involves rather a cluster of generalisations than a single major premiss, and that the task of judging its value resolves itself into separating these into better and worse ones, and getting the worse ones corrected. Indeed, if we leave the simplest and least interesting cases of argument out of account, it is easy to see that (when once the issue is clear) the whole process, as between two persons arguing, is a search on the part of each for false views held by the other as to the way in which certain things are connected in the ordinary course of Nature. The personal aim in every disputed question of fact is to show that your opponent's *general* knowledge is somehow defective; and the direct ostensible object is to show that in consequence of his ignorance he has reached a false conclusion in the particular case. The objector accuses the assertor, in effect, of being misled by appearances, or by words,—and thus of conceiving either his facts or his causal rules too

simply. The assertor accuses the objector of making too much of some small difference which is better left unnoticed. Between them who is to judge? Not Logic, certainly, or at least not Logic alone but Logic and special knowledge together. For this reason any mechanical logical rules for deciding the rights of an argument without regard to its subject-matter are of necessity futile. The function of Logic is not to judge which reasoned views about a matter of fact are best, but merely to establish a method for pursuing that elusive question in the fairest and most effective manner.

CHAPTER III

REASONING AND GENERALISATION

§ 16.—Hypothesis depends on Previous Theory

At several points in the preceding chapter the dependence of judgment upon previously-formed judgment, and especially upon previously-formed generalisations about the course of Nature, came into view. We saw, for instance, that all recognition of the relevance of a fact towards the proof of a given conclusion is nothing else than the recognition of such generalisations; that it is these which enable us to 'take facts for what they are worth,' and which limit and guide our analysis of facts into their important and unimportant details. We noticed too that disputed questions, when the dispute is carried far, depend rather on differences of view about the causes and effects of things than upon anything simpler. A dispute, for instance, as to whether a certain event happened or not is of a more resolvable nature, and comes sooner to an end, than a dispute as to *how* it happened and what it really involved or involves. So far as questions of fact can be distinguished from other questions,[1] the former

[1] As to this difficulty, see § 49.

have less controversial importance. Where verification is easy, difference of opinion flags for lack of material; theory, as such, is the vital point of disputes.

Accordingly Logic has considerable interest in the question how our major premisses — or our fragmentary glimpses of causation—are arrived at. But about this question the first thing to notice is its unnecessary vagueness as thus stated. There is an important difference between the question how the first of our generalisations came into existence and the question how an existing store of them grows and develops; and it is advisable to postpone any curiosity about the former problem until we have exhausted all the answerable questions in the world. For since we are without experience of a mind wholly ignorant of the ways of Nature there is nothing to check or to verify our guesses about the workings of such a mind. It is difficult to put ourselves at the point of view even of a dog with any assurance of success; how much more difficult must it be to imagine the state of a mind in which the conception of order in Nature has not yet begun. For this reason we shall here consider, not how the earliest generalisations of all were formed out of something not yet generalisation, but how they are formed in a mind which already possesses a store of general knowledge or beliefs. How does the man of to-day, or of any historical times, increase his experience of the ways of Nature?

The process, where any care[1] is used, consists of

[1] We may pass over the question whether generalisations are ever formed *wholly* without care, or by 'simple enumeration.' If there be any such cases the theory of careful inference has no concern with them. The two stages here spoken of are at any rate discoverable at a very low level of common-sense inquiry into the way things happen.

two stages,—guessing and verification. A certain theory of the connection between X and Y is proposed as a hypothesis, and then we proceed to examine how far it squares with the ascertainable facts. This does not mean, of course, that the division into two stages is always sharp or rigid, or that it is ever final; but only that these are the two distinguishable elements of the process, however much they may be repeated or entangled. A first hypothesis, for instance, is often discredited by a first attempt at verification, and this in turn suggests a slightly altered hypothesis which on further appeal to the facts turns out to require still further modification. We begin by observing that X and Y—*e.g.* hailstorms and thunder—are found in more or less close connection with each other, and we guess that they somehow belong together in the regular course of Nature. In seeking to do away with the vagueness of that 'somehow,' and to express the law in definite terms, various well-known operations are commonly performed,—such as observing carefully or minutely, collecting a large number of observations, trying experiments under control, or repeating experiments using more and more control over the circumstances, till we think we have eliminated as many sources of error as we need consider. And wherever we choose to stop this process of verification of guesses, we have got an inductive 'conclusion,'—for what it is worth. If there are any generalisations which leave no room for increased accuracy of conception and statement, due to increased acquaintance with facts, it is hardly in the name of scientific Logic that we can pretend to know which exactly these perfect

generalisations are. Indeed, when we leave out of account the few cases where it is at present most uncertain whether any fault will eventually be found, it is remarkable how easy it is to show of most of our ordinary generalisations that they will bear further refinement.

§ 17.—Verification also depends on Previous Theory

No one disputes the fact that our previous general knowledge of Nature is the only source of our guesses, but that it is also a chief determining factor in verification is rather less obvious, and its effects are often overlooked. Verification takes place by means of methods such as those which were formulated by Mill and are now duly reiterated in all the text-books which deal with 'inductive Logic,' but there are certain ways in which the usual account of them is misleading. A minor point is as to the number of distinct and separate methods which should be recognised. Herschel, whose view of induction seems to have greatly influenced Mill, distinguished no less than nine "rules of philosophizing."[1] Mill reduced the number, but it is not quite clear whether in his view they may best be regarded as five, or four, or two, or one; for he lays down five separate canons, heads the chapter[2] "The Four Experimental Methods," and yet acknowledges that the Method of Agreement and the Method of Difference are fundamental, the others being mere variations of them due to special circumstances of the inquiry. Finally, since he says[3]

[1] *Discourse on the Study of Natural Philosophy*, §§ 145-158.
[2] *System of Logic*, book iii. chap. 8.
[3] *Ibid.*, § 3.

that the Method of Difference "is more particularly a method of artificial experiment, while that of Agreement is more especially the resource employed where experimentation is impossible," and that "it is by the Method of Difference alone that we can ever, in the way of direct experience, arrive with certainty at causes," there is some ground for holding that Mill in fact recognised no more than one fundamental method, with four inferior substitutes to be used where the circumstances allow of nothing better. If we once begin to take awkwardness of circumstances as creating separate methods, where is an end to be found to the number? If difference of circumstances involves difference of method, then we should have to admit that every worker in every branch of science uses special methods of his own.[1]

The unity of inductive method would perhaps have been still more apparent to Mill if he had consistently seen that his Method of Agreement and his Method of Difference cannot well be conceived as two separate ways of attacking the same problem, but are rather statements—misleadingly abstract statements, but let that pass for a moment—of what is required for the verification of a theory at two different stages of its growth. Under this aspect of them the kind

[1] It may also be remarked that the names 'Method of Agreement' and 'Method of Difference' are not quite happily chosen, for the reason that each of them equally requires both agreement and difference in the circumstances observed. The essence of the so-called Method of Agreement is that two or more cases which agree in exhibiting the conjunction of X with Y should also *differ* in as many other respects as possible; for if they do not differ sufficiently, the inference tends to be by 'simple enumeration.' Similarly the essence of the Method of Difference is that the cases observed should *agree* in all but the presence of X; or else the argument tends to be merely 'post hoc, ergo propter hoc.' Though the first method relies upon agreement in the midst of difference, while the second relies upon difference in the midst of agreement, in both alike every point of agreement and every point of difference must be observed with as much care as the case requires.

of problem supposed to be answered by using the Method of Agreement is whether the conjunction of X with Y is (approximately) universal; whereas the Method of Difference is supposed to tell us whether some particular observed event has been correctly analysed into cause and effect. What probably led Mill to overlook, at times, the difference between these two inquiries was the reflection that a generalisation is 'merely empirical' until we can see causation behind it; hence a generalisation of the form 'All X are Y' must be broken up into generalisations of the form 'A causes a'[1] before it has a right to be called an induction in the stricter sense. And it is quite true that (since the same cause always has the same effect) the inquiry whether A in general causes a cannot be distinguished clearly from the inquiry whether A did cause a in any observed occurrence in which A and a are found in succession. Still, it is also true that investigations which afterwards develop into detailed questions about strictly uniform succession between A and a normally begin with the vaguer problem whether X and Y are connected otherwise than accidentally; and that for attacking this vaguer problem the plan of singling out agreement in the midst of difference is often more suitable than that of singling out difference in the midst of agreement.[2]

However, we all agree that, where the problem is to verify the guess that A is connected with a by 'direct' causation, the only method consists in analys-

[1] I here adopt Mill's symbols, in spite of their obvious defect. There seems to be no way of expressing in letters a supposed cause and a supposed effect without emphasising either the connection or the disconnection unduly.

[2] Mill came near seeing this when he said (8th edition, vol. i. p. 455), "The Method of Agreement is chiefly to be resorted to as a means of suggesting applications of the Method of Difference."

ing one or more observed occurrences until we are satisfied that errors have been sufficiently provided for. The best way of doing this—where it is possible—is to introduce the factor A into a known set of circumstances, BCD, and then see what happens. If *a* appears, we argue very naturally that this change (assuming it to be the only change observable) was directly due to the prior change we made in the circumstances. But often, as Mill recognised, we have to put up with less conclusive evidence, whether we do or do not dignify these second-best operations with the name of inductive methods. If we cannot use the direct Method of Difference we use the nearest approach to it that circumstances will allow.

Now the defects of the second-best methods lie mostly on the surface, and are admitted, I believe, by all expounders of them, including certainly Mill himself. As he carefully explains, they are only approximations to the Method of Difference, and their value depends on their approximation to it. But what Mill did not clearly see, and what the usual exposition in the textbooks also tends to overlook, is that even the Method of Difference is (so to speak) only an approximation to itself. That is to say, there is a difference between any attempt to apply the method in the concrete and the method itself as an abstract ideal; we never have any guarantee, except so far as our incomplete store of general knowledge can give us one, that an apparent application of the Method of Difference really fulfils the stringent conditions required by it. In the abstract no fault can be found with the rule, but it is always in concrete cases that any rule must be applied, and nothing is easier than to apply it wrongly. Regarded as an

applicable rule it does not show us how to reach true inductions, but merely expresses the aim we have always had in view whether the inductions actually reached are true or false. What is insufficiently dwelt on in the usual formal account of the method is that the guarantee of correctness is not to be found in the Method of Difference itself, but in the wisdom and care with which we apply it,—wisdom previously gathered and care which is objectless except through our past experience of the possible risks of error. Even in the best and most recent textbooks[1] this point is somewhat scantily treated, while in others which are still widely used[2] no reference is made to it, and the account that is given leaves the student under the impression that the value of a given experiment consists in its *appearance* of fulfilling the ideal of the Method of Difference, rather than in the soundness of our judgment (external and prior to the application of the method) that this appearance is not in the given case deceptive,—as it is, for instance, in every successful conjuring trick, and in every experiment by which science is in the smallest degree misled.

The weak point of the rule[3] that is laid down by the Canon of the Method of Difference is to be found

[1] See for instance Mr. Carveth Read's *Logic, Deductive and Inductive*, pp. 180-183.

[2] *E.g.* Jevons's *Elementary Lessons*, xxviii.

[3] This rule or 'canon' was stated by Mill as follows: — "If an instance in which the phenomenon under investigation occurs, and an instance in which it does not occur, have every circumstance in common save one, that one occurring only in the former; the circumstance in which alone the two instances differ is the effect, or the cause, or an indispensable part of the cause, of the phenomenon." The wording of the rule is somewhat obscure, but Mill's illustration of it removes all the vagueness except as to what may be meant by a 'single' circumstance. What is required, Mill says, is a double set of instances, ABC becoming *abc*, and BC becoming *bc*; this is supposed to prove that A causes *a*; and, no doubt, would prove it if we could be sure of the singleness of the circumstance called by the single name A.

in its glib use of phrases like 'every circumstance save one,' and 'the circumstance in which *alone* the two instances differ.' All talk about 'single circumstances' is loose talk, and the fact that any mistakes are ever made in attributing given effects to particular causes is itself a sign that it is possible to take for a single circumstance some circumstance which is not single but complex. Indeed, if we think of it, there can be no other source of false causal explanation. This is most easily seen in cases where the fault does not involve a great amount of carelessness. When we have begun to get beyond the savage method of merely singling out any striking antecedent circumstance (such as the appearance of a comet) and any striking consequent circumstance (such as a defeat or a pestilence), and connecting the two as cause and effect with a minimum of reflection,—when we have begun at all to collect and compare instances, and to make experiments,—then our fault, if the inference is faulty, evidently consists in our having made an insufficient analysis of the circumstances. The 'single circumstance' A, which we added to the set of circumstances BCD, is (whenever our inference is false) not really single, but is a mixture of circumstances some of which are essential to a's occurrence and others not so; and the name A, applied indiscriminately to the whole of them, emphasises the wrong set of the component circumstances.[1] In performing this operation we have tried to use the Method of Difference, but we have applied it wrongly *because our facts were wrongly conceived.* All careful ex-

[1] A striking instance, too long to quote here, is given in my book *The Process of Argument*, pp. 95-97. In the same way the complex fact which consists partly of prayer and partly of keeping your powder dry may easily have one of these two component details over-emphasised.

planation of an occurrence as causal involves the use of the Method of Difference or one of the makeshift methods which aim at the same result; but precisely because, owing to mistakes of fact, we can apply them wrongly, error is possible,—and frequent. We may always fancy a named circumstance single, but we can never be sure that it *is* single, or that the name A is not misleading in this context, until we are sure that our inductive inference is free from error. So that to put forward our use of these axioms as any test of the correctness of our inference is to put the cart before the horse.

§ 18.—Use of the Inductive Methods

We may here ask, regarding the inductive methods, as we asked in last chapter about the Syllogism, whether this criticism is intended to condemn them entirely. And again it can be freely admitted that something less than total condemnation is sufficient. Just as in the case of the syllogistic conception so in the case of the Method of Difference, the mischief only begins with the assumption that the fact of using it (*i.e.* of intending to use it, and thinking we have done so) can by itself give anything like what Mill[1] called 'rigorous certainty.' It is true that Mill seems to have been at other times aware of difficulties in applying the method, and that various later writers[2] have discussed these difficulties at considerable length. Yet there is room, I think, for further attempts to bring before the student the

[1] Vol. i. p. 459. On the same page he speaks of it as an "infallible method."

[2] For a purely hostile account see Mr. Bradley's *Principles of Logic*, book ii. part ii. chap. iii. Dr. Venn's more sympathetic treatment of the question (*Empirical Logic*, chap. xvii.) is naturally fuller of useful suggestions.

fact that an inductive conclusion does not get its value from the mere use of any inductive method, but from a quality which in varying strength accompanies such use. Whatever name we may give to that quality,—care, or discretion, or insight, or scientific genius,—its effectiveness on a given occasion is limited by our previous knowledge bearing on the point; and this is indeed the only explanation of the extraordinary scientific errors (as they now seem) committed by the intellectual giants of former times. No doubt they knew, in the abstract, what was wanted for proof, as well as the most modern inquirer, but they had less material than we have for judging correctly whether the required conditions had been fulfilled in the given case; they had a scantier experience in detail of the risks of error.

The abstract conception of the way to use observed agreement and difference in verifying a theory may help us, just as that of the syllogistic framework may help us, to see where the weak point of a given piece of reasoning is to be looked for. The specially questionable part of a syllogism is, as we saw, its middle term; and the specially questionable part of any inductive process is the assumption that named circumstances which we have taken as single may safely be so taken. Just as the claim that a given conclusion rests on a certain major and minor premiss draws express attention to the middle term, so the claim that an observation or experiment has been conducted according to the Method of Difference draws attention to the implied assumptions about the singleness of the circumstances that have varied or persisted. In themselves, and apart from the material knowledge which directs our use of them,

neither the inductive methods nor the Syllogism have any claim to respect. To use them is merely to reason somehow; but the correctness of our reasoning depends (where any care is taken) on the previous knowledge we can bring to bear upon the facts we handle. Here, then, as everywhere throughout Logic, formality is the chief snare to guard against. Here again it is the mechanical nature of the rules which deprives them of value; the real danger is not of breaking or ignoring them, but of applying them wrongly. So far as we incline to dwell on the abstract form of the inductive method or methods, for instance by illustrating them in letters like ABC and BC, *abc* and *bc*, or even by choosing concrete examples where the conclusion is of an indisputable kind, the result is that we restrict attention to that class of inferences which least exemplify the need for Logic, and the sources and limits of its power to deal with difficulty. There is of course much excuse for this. Every one who has tried to find examples of inductive generalisation must have felt the force of the temptation to illustrate rather the satisfactory than the unsatisfactory use of the methods. It is not only that satisfactory conclusions mean as a rule comparative lack of difficulty in the subject-matter, and that the process is therefore more easily followed and understood; but an even more enduring source of the preference shown for them is the fact that all faulty generalisation involves, as such, a departure from the ideal which the method sets up, and hence may be said not to illustrate the method at all. Thus an instance of 'simple enumeration,' it is felt, can scarcely be considered an instance of faulty use of the Method of Agreement, since it does

not comply with the requirements of the Canon; and the same with the argument from *post hoc* to *propter hoc* as illustrating a faulty use of the Method of Difference. On the principles followed throughout this book, however, and stated in § 35, a mere verbal obstacle like this should have no terrors for us. Let it be consistently held that these Canons are pure ideals, and *all* concrete illustrations of them at once become impossible, since there is never any means of getting final satisfaction that 'only one circumstance' has varied. To say that an ideal method cannot fail is only to repeat in other words that it is an ideal; and since our actual inductive reasonings, by means of the supposed use of these methods, notoriously *can* fail, it is the interpretations put upon the rules, not the rules in the absence of all concrete interpretation, which are all we can really mean when we speak of the canons or axioms or methods as admitting of illustration.

And when we judge them by their use and application, the source at once of their value and of their misleading power is to be found in our previous 'knowledge.' In interpreting any observed occurrence everything depends upon the views and prejudices we already hold about the possible causes concerned. To this source are to be traced both our success and our failure in reaching truth, both our agreements and our differences of opinion. The child who believes that the trees cause the wind, the savage who cowers before an eclipse of the sun, the learned antiquarian who thought the draught from the open window put out the electric light, differs not in his mode of reasoning but in the stored-up relevant knowledge at his command, from the wisest

statesman who interprets the facts of history or from any specialist, scientific or otherwise, who observes and judges correctly the facts that belong to his own department. Bare fact is a thing unknown to us; all facts are what they are for us by virtue of the way in which our previous knowledge helps or hinders our understanding of the special case.

There is perhaps at first sight an appearance of something like fatalism about this view, as if the avoidance of error was a matter wholly beyond the individual's control, and the study of Logic therefore a vain pursuit. Even if it were so, that would scarcely be an argument against the truth in question; but there is no need to expect from it any such consequence. The moral of the truth that previous knowledge is reasoning power should not be that Logic is a worthless study, but only that it becomes worthless in so far as we are content to leave it abstract and formal. To admit that Logic cannot make us infallible is not to admit its futility, unless indeed we persist in conceiving Logic as a system of perfect certainties,—as the formal logician seeks to conceive it. Against Formal Logic the view that correctness of reasoning depends on our grasp of the subject-matter may, no doubt, be taken as hostile, but in no way can it be considered hostile to the Logic which attempts to recognise everything that helps to explain the sources of success and failure in reasoning. Once admit, as natural science now admits, that there is no finality of knowledge of the ways of Nature, and we thereby admit that all our inductive investigations are subject to the same ultimate discount. But the distinction between better and worse induction remains un-

affected by this admission, just as the distinction between motion and rest remains unaffected by the consideration that absolute rest is unknown. To call a statement true does not nowadays mean that its truth is of a kind that can never be improved or corrected, but merely that it belongs to a class of statement which, judged by some not wholly unpractical standard, may rightly be taken as satisfactory until the correction comes. Truth, as we now conceive it, depends on the absence of intelligible objections other than the one vaguest objection which applies to all known truths alike,—the objection that man is fallible. To call a statement true is therefore merely a challenge to all the world to find if possible some special fault with it,—to show, for instance, that one of the facts on which we rest the statement was in some way wrongly conceived.

§ 19.—The Notion of a 'Cause'

The question may be asked, how far is it here intended to press the quarrel with common-sense views of causation. It is well-known that any one who cares to do so can show that the whole notion of a Cause is riddled with verbal contradictions. And if we are of those to whom verbal contradiction is a hopeless obstacle we shall decide that causation is a "mere practical makeshift," and discard all use of the notion,—if we can. From the point of view here taken, however, makeshift truth is not a thing to be despised or avoided, but to be used until some definite improvement can be made in it; indeed, can anything higher be said of any truth than that it enables us to deal sufficiently well with

concrete problems? And if there is to be any distinction at all between better and worse reasoning there must be the distinction between better and worse causal explanations of concrete events; all causal explanations cannot be equally condemned as illusory. Difficulties about Causation, like difficulties about Truth, have no practical or theoretical value when they are pushed to the length of destroying the distinction between causal and other sequence, or the distinction between truth and error. What importance they have depends upon their leading us to take care in observing, not upon their tendency to make us think that knowledge is impossible and all inquiry therefore a waste of time. If, however, we keep in view this necessary limitation of criticism, a good deal of advance may at any rate be made beyond inductive Logic as Mill conceived it. We may safely recognise, for instance, that in his system the abstract Law of Causation is given an importance to which it is not entitled, and that the assumption that things and events consist of single disjointed 'circumstances,' each of which is 'invariably' connected with some other, is pressed far beyond the legitimate use and value that can be claimed for it. It is an artificial view of Nature,[1] and like every artifice it must be carefully watched lest it become misleading.

First as to the law of Causation. Those formal logicians who include inductive Logic as part of their province[2] seek for some one comprehensive principle

[1] To this charge it would be no answer to say (what is probably true enough) that all writers on inductive Logic are aware of the artifice. The question is not whether they know, but why they do not use the knowledge in constructing their system.

[2] We noticed above (p. 9) that there is some disagreement among formal logicians on the question whether inductive Logic is properly to be

which may stand towards inductive conclusions generally in the relation of major premiss. They fail to recognise that any such axiom must be, like Jevons' Principle of the Substitution of Similars, either a misleading half-truth or a meaningless truism, according as it is made applicable or left purely abstract.

We all agree, no doubt, that Nature is in some sense uniform; only, when it comes to interpreting this axiom, or to testing its truth, our lack of omniscience becomes a serious obstacle. The proportion that our knowledge of Nature bears to the truths of Nature cannot, of course, be known. But at any rate it is small enough to render surprises frequent; and every such surprise is a case where a sequence of events (A followed by a) hitherto supposed to be a case of Nature's Uniformity—a case of 'invariable[1] sequence'—turns out to be more complex than we imagined, and the occurrence of a is found to be, partly at least, conditioned by other things than A. What looks to us the same cause is often found not to produce the same effect; what looks to us the same effect is often found to have been produced by different causes. That which is true of a thing is often untrue of another thing which seems its 'like, equal, or equivalent.' And until our knowledge of Nature is complete we shall never be free from these surprises, for the progress of knowledge necessarily involves the correction of rules which we have hitherto regarded as trustworthy. And the more

considered part of their subject or not; but they would probably agree that any Logic must be either formal or else not 'scientific.'

[1] Though Mill sometimes preferred the expression 'invariable *and unconditional*' at other times (*e.g.* vol. i. p. 393) he saw that "the antecedent which is only conditionally invariable is not the invariable antecedent," and that therefore the word 'invariable' is sufficient by itself.

comprehensive the rule the more this applies; the small generalisations which guide us in a strictly limited branch of inquiry take a less extended risk than those which pretend to cover the whole field of human knowledge.

Even if we break up our Law of Causation into a group of inductive canons, we are still framing highly comprehensive rules, and the danger is that because they are undeniable when made abstract we shall overlook their shortcomings when they are made applicable. If there is a sense in which they are true, it is a sense which ever eludes our grasp, for as soon as we tie them down to concrete applications they cease to be true in the whole extent of their generality, and so become misleading when used as major premisses. For the purpose of drawing any particular conclusion the vague belief that Nature is *somehow* uniform is irrelevant; the only relevant question is whether we have conceived some particular piece of supposed uniformity without important error. It does not help us to know that a given event must have had *some* cause, and will have *some* effect; always the question is precisely *what* is essential and what is accidental to this or that fact observed.

Secondly, as to the disjointed view of the facts or circumstances. It is admitted, of course, that all explanation of events—and indeed the very form of the question, 'what is essential to what,' or 'what leads to what'—involves the conception of separable portions of an occurrence, however strictly continuous the stream of occurrence may be. But there is a great difference between admitting the practical need of this assumption and forgetting its artificiality. Granting that in no way can we hope to reach a

complete understanding of the ultimate nature of causation, still to suppose the course of Nature really continuous and only artificially discontinuous enables us at least to remember that between any two stages there is room for intermediate ones, or that if A and a are separated at all the filling of the gap between them is (along with A) part of the cause of a,—part of what leads to a. Immediacy of sequence would, no doubt, be convincing evidence of causation; only it is well to remember that a really immediate sequence is never found,—that to separate A and a is always to leave out of sight the bridge which as a matter of fact connects them. Mill was content (p. 541) to note this case as occasional.

Similarly with the separation of A from the contemporary circumstances BCD . . . Z. To admit the artificiality of this separation is to admit a corresponding vagueness in our assertion that the sequence A followed by a is 'unconditional,' and therefore quite strictly invariable. Every experienced case of A differs *somehow* from every other, and the question which of its many details are essential to its A-ness, and which are accidental to that and yet are conditions of the effect a, is the question of questions in deciding how to specify a's cause. So far as we have to be content with an unsatisfactory answer to it, 'unconditionality' as evidence of causation is a broken reed.

Of course we do not remove the mystery of causation, of growth, or of change, by 'beating it out thin.' The problem how anything can become something else is just as difficult, theoretically, when the change occurs in the millionth part of a second as when it takes a million years. All that we can do

by making the interval short is to make a more direct appeal to our existing knowledge of what leads to what. To see how one thing leads to another is never quite to get a vision of continuity, but only to recognise as familiar the separate links that make up the chain; and our familiarity with any one of the links, though it may conduce to carelessness of inquiry, is no complete guarantee that we know all that is worth knowing about it.

From all this it appears that the distinction between a causal law and a merely empirical law cannot be made quite satisfactory. That generalisations are better in so far as we can see causation behind them is a statement which has some convenience, but only when we do not ask too closely what it means. For then we are led either to deny or to admit our ignorance of the precise nature of causation. In the former case the reality of that inevitable ignorance is sure to lead us into false positions thinly disguised by evasive language. In the latter case we admit indirectly that so-called cases of causation are nothing but those generalisations which we think most nearly proved, and that therefore to say that a general rule is proved when it is found to be causal only means that it is proved so far as its proof is forthcoming.

Our ignorance of the meaning of causation is of course only the same kind of ignorance as that of the meaning of 'Truth.' The abstract idea of causation, like that of Truth, is among the most familiar of our mental possessions. Indeed, we can form no conception of what a mind would be like which attempts to think without making *some* distinction between truth and falsity, and *some* distinction between connections which are essential (causal) and

those which are accidental. What in both cases we do not know is how to get sufficient security in applying these distinctions. Practically what we do is to use varying standards of accuracy, and to be content when we get near enough for some purpose we have in view. And as regards the question what caused Y (or whether X did or did not cause Y) on a given occasion, our view is determined partly by the other views of causation we have already acquired and partly by what may be called the *apparent* unconditionality of the sequence. Every observation or experiment is a view of an 'event,'—a change; and the conception of a change involves not only that of a relatively unchanging background against which the change stands out to be seen, but also that of an event divisible (ideally) into two portions, which we call the antecedent and the consequent events. Whenever an occurrence of any sort is observed, there is no room for doubt that something has caused something; and the sole doubt attaches to the question what precisely caused what. To the intricacies of such a question no perfectly final end is to be expected, though a working satisfaction may often be got with a little trouble, and a delusive one still more easily.

And the nearer we get to a satisfactory account of what caused what in a given occurrence the more the doubt that remains tends to become a doubt whether the names by which we describe the cause and the effect respectively are sufficiently accurate. In the grosser kinds of error of explanation,—for instance where in observing a conjuring trick we fail to notice the hidden cause and set down the result to something which had no share in it,—there is what

every one would naturally call a downright mistake, rather than an insufficient or misleading description. But it is evident that, since fineness of error consists in the mingling of truth with error, errors of explanation are fine—and therefore difficult to deal with, and therefore of special importance to Logic—in proportion as the 'X' which we take to be cause is really *part* of the cause; so that the error consists in describing the cause as X, rather than as X+Z. For if both X and Z are necessary to the production of Y, then the generalisation that X and Y are essentially connected facts is a mere half-truth; it holds good only of those cases of X which are also cases of Z, and will mislead us if we apply it more widely.

In spite of the fact, then, that inductive logicians generally dwell at some length, and often most instructively, on the practical danger attaching to our judgments about the behaviour of 'only one circumstance,' there may nevertheless be room for a still further extension of the movement of which Mill was one of the pioneers. What we need is to have the recognition of this danger incorporated into logical theory, and not merely joined on to it by an afterthought. Mill himself, as we have seen (p. 95), sometimes forgot, in speaking of the Method of Difference, that in every careful but false induction the observer imagines that he has used this method as nearly as possible; forgot, therefore, that however rigorously certain the abstract Method of Difference may be, the only Method of Difference that we can apply gives us a false security. Formal inductive logicians of the present day take a rather half-hearted course between excessive belief in the value of the methods and due recognition of their defects as a part of logical theory.

For instance, Mr. Carveth Read[1] expresses a widespread opinion when, after speaking of the danger, he says:—

> It is right to touch upon this well-known sceptical topic; but to insist much upon it is not a sign of good sense. The works of Herschel, Whewell, and Jevons should be consulted for the various methods of correcting observations, by repeating them, averaging them, verifying one experimental process by another always refining the methods of exact measurement, multiplying the opportunities of error (that if any exist it may at last show itself), and by other devices of what may be called Material Logic. But, probably, only many years spent in the study and personal manipulation of scientific processes, can give a just sense of their effectiveness; and to stand by, suggesting academic doubts, is easier and more amusing.

With most of this we can all agree, and its chief defect is the encouragement it seems to give to the popular belief that the suggestion of academic doubts is never made except in the interests of idle amusement. That there are all sorts of sceptics I would not deny, but why should we consider only the variety of them who suggest their doubts in this spirit? Why, especially, should we view their existence as any reason for concealing the real weakness of the abstract inductive methods? A scientific investigator, for example, acquires his scepticism not at the cost of his good sense and practical capacity but rather by the exercise of them. Mr. Read's vague phrase "to insist *much* on it" seems also to point to some misapprehension of the best way to combine scepticism with good sense and practical ability; which is not by applying a limited and fixed *amount* of scepticism, but by intelligently selecting the right occasions for applying respectively as much and as little as possible.

[1] *Logic, Deductive and Inductive*, p. 194.

It may be noticed also that the task of improving the theory of Logic, and that of applying it to actual arguments, are to this extent different: that while the degree of care and refinement required for the latter task is determined entirely by the degree of correctness which will serve the practical purpose contemplated, no limit can be set to the care and refinement needed for the former,—except, of course, the limit noticed above at p. 101. Apart from this, the only limit is a shifting and personal one, set by the power of the logician to see and express intelligibly difficult and complicated truths. The extent of this power is dependent, among other things, on the extent to which the science and civilisation of the day have developed the resources of language. And since the effectiveness of any general device for testing inductive inquiries is never perfect, and is not equally strong on all occasions of its use, you achieve more by studying its imperfections and relating them to this or that kind of occasion, than by shutting off your critical power, vaguely conceiving of the method as perfect or nearly so, and adding occasional afterthoughts under haphazard compulsion from stubborn facts that refuse to be silenced. Even though the theory of Logic must lag a little behind its application by those engaged in special scientific work, there seems to be no reason why the logician, as such, should attempt to hold it back. As we shall see in chapters vii. and viii., the childish or playful sceptic is harmless in every way, and easily disposed of. We need not make a bugbear of him, and least of all in the name of Logic or Philosophy.[1]

[1] On this point see also my book on *Distinction*, pp. 223, 224; and *Mind*, 1895, pp. 303-306.

CHAPTER IV

REASONING AND JUDGMENT

§ 20.—A Problem of Definition

We next come to certain difficulties about the definition of 'reasoning,' and to the consequences of admitting them to be insurmountable. The puzzle is to distinguish clearly between reasoning and certain other mental processes, or at least mental processes which are commonly called by other names. It is difficult, I mean, to distinguish them in concrete cases,—for of course it is always easy enough to mention a pair of contrasted words. We can mark off 'reasoning,' in the abstract, from 'simple unreasoned judgment,' but can we apply the distinction correctly? In § 24 we shall notice the kind of importance this question has for Logic as contrasted with Psychology.

'Reasoning' is one of the many words which do not require translation. No one who asks for an explanation of it is quite in the position of those who first make acquaintance with a purely technical term. We all know something about its meaning, since the word is freely used in everyday language. However vaguely we may conceive the nature of the mental act so described, we think of it as contrasted with

simpler acts of mind,—in the same sort of way as a chain may be contrasted with any one of its single links. And this conception of it, we find, is expressly put forward and dwelt upon in the traditional Logic. Reasoning, or Inference, is something more than mere Judgment, we are told[1]; the latter is not reasoning because it is not the movement *from* facts (or premisses) *to* a conclusion. But there the old logicians leave the difficulty, without apparently being aware that any difficulty exists. It is the vice of the abstract or formal treatment of Logic everywhere that it leaves untouched the points that are most interesting and instructive. If we make the verbal distinction between reasoning and judgment turn on the supposition that the latter is absolutely unreflective, innocent of grounds or reasons, does not proceed from data to conclusion, or is, in a word, a single link and not itself a piece of chain, then it becomes a highly pertinent question whether any such mental acts are in fact to be discovered, and if so which exactly they are. However sharply X in the abstract is distinguished from Y, any concrete instance of either may be challenged to show its right to the name, and until the challenge is satisfactorily answered it remains only a case of so-called X or so-called Y. When an instance is taken we may perhaps by looking carefully at it be able to see that

[1] In modern textbooks the distinction is scarcely made so prominent as formerly. Whately is perhaps the most recent instance of a writer who can be said to take the old division between "the three operations of Thought" (simple apprehension, judgment, and reasoning) as rigidly as possible. See his chap. i. § 1. And in his Essay on the province of reasoning he goes so far as to say that the process of observation and experiment is not a process of argument; and again, that "the bare process of reasoning, *i.e.* deducing a conclusion from premisses, must ever remain a distinct operation from the assumption of premisses." For an interesting statement of the problem from a modern point of view, see Bosanquet's *Logic*, vol. ii. chap. i.

it is not really so simple as it seems; we may see that 'so-called Y' shares in the nature of X to some extent, and so cannot be sharply contrasted with it. Now we may either raise this question or not, but we had better make up our minds which course we will take. At least, we must not set out to inquire into the difference between reasoning and instinctive judgment, and then be satisfied to solve it by mere definition. And it is not always easy to remain aware of this risk, especially when it is concealed by the use of technical language. As soon as we begin to talk of 'reasoning strictly so-called,' or 'reasoning in the proper sense of the term,' we are professing a kind of knowledge which is far less within our reach than a ready use of these phrases may allow us to suppose.

§ 21.—Some False Solutions of the Problem

There are two chief fields in which the difference between reasoning and instinct may be sought for,—in comparison between the deliberate and the rapid judgments of man, or again between the judgments of man and those of the lower animals; and in both the danger of a sham settlement of the question should be kept in view. The difficulty is that in both cases the inquiry, if pressed far, reaches a point at which the verifiability of our theories vanishes. When a man discovers in five minutes the cause of the stoppage of a clock we all agree that he reasons it out; but we do not all agree how to name—whether as reason or as instinct—processes of thought which are performed much more rapidly; for instance, the general's sudden decisions in a battle, or the orator's choice of words and tones and gestures. Is

not our uncertainty whether to call such judgments reasoned or intuitive due to the fact that, in proportion to the rapidity of the judgment and the mass of details judged, the difficulty increases of knowing what really took place in the mind concerned? Even if the mind in question is our own, we can find innumerable cases of rapid judgment where memory can tell us nothing of the steps; we are left wondering how we suddenly came into our vision of the truth, or why we acted so rightly on the spur of the moment. Because we cannot in these cases follow the action of the mind, we do not know whether it does or does not resemble reasoning in every respect except the time it occupies. For all we know, the apparent simplicity of the process may be an illusion, like the apparent simplicity of a flash of lightning. As our eyesight fails to report the to-and-fro movements of the lightning, so our retrospection of a rapid judgment may fail to report the steps by which our indecision gave place to decision when our apparently instantaneous judgment was reasoned out.

In the comparison of our judgments with those of the lower animals the chief difficulty is that of interpreting correctly the signs, or of clearly imagining what goes on in a mind which is to an unknown extent both like and unlike our own. Ignorant as we are of the precise nature of the differences among human minds,—*e.g.* between those of men and women, or black and white, or prince and pauper, or Protestant and Catholic, or English and Continental — we are naturally much more so when the minds compared are those of the man and the dog. Professor William James[1] supplies an interesting set of animal stories

[1] *Principles of Psychology*, ii. 348.

collected from various sources, and seems to incline to the view that none of them are cases of reasoning. But the difficulty is to find any distinct ground of difference, any characters which differ otherwise than gradually from the clearest cases of reasoning. Of course we can make verbal grounds of difference, in any number we please; but that would be to attempt to solve the problem by mere definition; it would only alter the form of the difficulty. We might, for example, contend that "simple contiguous calling up of one whole by another is quite sufficient to explain the phenomena." But then we only raise the question whether *what is called* the "simple contiguous" process differs essentially from reasoning,—a point about which there may notoriously be two opinions, and a question which is itself in danger of being stifled by mere definition. Similarly there is no real help to be got from making the distinction turn on the question whether the circumstances in which the act takes place are strange or familiar. If any of our experiences were absolutely strange or novel we could not reason from them at all, and if any were entirely familiar our conclusion would not have advanced beyond our data. But since, as a matter of fact, all our experiences contain a mixture of more and less familiar elements, this account of the turning-point of the distinction is again no more than verbal. It merely alters the form of the difficulty, by raising the question how to distinguish between circumstances which as a whole deserve to be called strange and those which as a whole deserve to be called familiar. Since the difficulty is a real one it survives all changes in its external form.

§ 22.—Judgment as Process and as Instrument

Let us turn now to another suggestion. Can we make a clear distinction between judging, as the *formation* of judgments, and reasoning as the *employment* of judgments already formed? That the distinction has some value may be seen from the difficulty, noticed in §§ 4 and 6, of classing our most undeniable axioms as judgments at all, since they involve no act of rejection. There is no intelligible *formation* of judgment in the case of our most fundamental axioms, since we cannot in imagination put ourselves back to the time—if there ever was a time—when a choice was allowed us between believing and disbelieving them, and when we answered 'yes' where we might conceivably have answered 'no.' On the other hand it looks as if we could and did *use* these axioms, and as if the use of them in connection with minor premisses was precisely what is meant by reasoning. Passing by the question (discussed above, p. 33) what is the real nature of the widest and most abstract major premisses we can actually use, we may still admit that there is a difference between forming and using a judgment; the difficulty is to disentangle the two operations as we find them combined in any judgment we can examine. The formation of a judgment is often a long process, including many checks and fresh starts; and it is often extremely difficult or impossible to say, except quite arbitrarily, when it comes to an end. For those, of course, who possess an infallible guide, it ends as soon as the oracle has spoken, but for the rest of us even the most authoritative pronouncement may

need revision at any time. And these checks and tentative movements that occur while the judgment is in the making consist in treating the half-formed judgment as a hypothesis, and *using* it to deduce imaginary consequences. Then if reasoning is defined as the using of judgments it cannot be contrasted (except verbally, or in the abstract) with the formation of judgments, since it is a part of that operation wherever they are formed with any care. Moreover, it is at best an unverified assumption to suppose that even in our hastiest and least considered judgments reflection plays no part. Of course nothing is commoner than to talk of people making 'wholly unreasoned' assertions, or 'jumping to conclusions,' or 'speaking without reflection.' But unless these are merely forcible ways of saying that the person so proceeding has not used reflection *enough*, it is hard to see how they can be justified. At any rate the only ground we have for denying the presence of reflection in judgments where we cannot directly perceive it is the same kind of ground that we formerly had for denying the oscillations of the lightning, or any of the unsuspected facts which instantaneous photography has brought to our notice.

Although, therefore, we cannot quite clearly distinguish between the formation of judgments and the use of them when formed, and cannot imagine the formation of a judgment as a process with a clearly-marked beginning or end, we may perhaps conceive of reasoning as the reflective movement of thought which accompanies the formation of a reasoned judgment at all its stages, rather than as the forward-reaching movement which it is the special business of reflection to control and guide to safety.

That the influence of reflection is always beneficial there is no need to assume,—sometimes first thoughts are best; but at any rate criticism involves and begins with reflection, and reasoning depends for its value upon a judicious admixture of criticism. And the work of reflection consists chiefly in pruning away exuberances of belief and in keeping an eye upon the likelihood of error. In the more leisurely kinds of reasoning, where the process can be observed, we find the usual result of reflection to be that some parts of the judgment grow safer against attack and fuller of meaning, while other parts wither away or lose importance. Hypothesis and verification, each performed under a sense of the need for analysing 'facts' till their essence is discovered, constitute the framework of its method.

§ 23.—Reasoning as the Advance to a Conclusion

A further ground for doubting whether a sharp distinction can ever be made between reasoning and judgment is that when we take the word reasoning in the second of the two senses noted at p. 58,—when we do not view reasoning as reflection but merely as the forward movement from data to 'new conclusion,' —we inevitably get drawn into the difficulty of distinguishing between one judgment and 'another,' or between one judgment and a number of judgments. These difficulties do not exist for the formal logician, —or only so far as he now and then deserts his principle that sentence and assertion are the same, —since sentences are distinguishable from each other, and are therefore as easily counted as a row of figures.

But it is far from being an easy question how much change in a given *judgment* we ought to regard as constituting 'otherness,'—especially if we admit that the formation of a judgment is rather a case of growth than of sudden perfect achievement. May not the so-called leap to new conclusions be also just as truly a case of growth? Possibly any stages or halting-places we find it convenient to recognise are only artificially marked off from each other by dropping out of sight the links that come between. If any steps at all are to be recognised—any passage *from* something *to* something else—what is to decide the length of these steps; what is to prevent our searching between any so-called steps till we find a bridge over the gap between them and see the end only as the development of the beginning, rather than as something distinct from it. If so, then the difference between a piece of reasoning and a simple judgment would be merely that the former (when made explicit) is an artificial isolation of two stages of the latter's growth. And that would help to explain our notoriously common failure to 'give our reasons' for a conclusion. By the time a halting-place (a conclusion) is reached we have kicked away many of the ladders by which we reached it, and our remembrance of the details of the climb has suffered some loss; a vague and general account of the steps is usually all that can be given, and this makes them seem more disconnected than they were.

§ 24.—The Effect of Admitting the Difficulty

The problem what to do with these difficulties, once we have allowed ourselves to see them, presses

for answer; and our choice seems to lie between some kind of 'mythology'—*i.e.* explanatory hypothesis—and some kind of non-explanatory verbiage. If we decide against the latter course, and confess our uncertainty as to the inmost nature of rapid intuition, we have nothing for it but to resort to openly speculative methods. We must guess, and then see what results from our guesses, what help they give or what contradictions they lead to.

Let us make the hypothesis, then, that all judgment, even the least apparently rational, would be seen to be precisely the same in structure as reasoning or inference if we could magnify it sufficiently, and could fix the moving picture sufficiently, to render vision of it possible; that in the briefest flash of intelligence there is the same comparison of provisional theories with apparent facts as in the most deliberate reasoning, only quicker and vaguer and less in quantity; and that there is always room for more of this 'reflection' except so far as practical needs, external or internal, put an end to the process and allow us to claim to have reached a *conclusion;* and that therefore the end of a piece of reasoning is related to its beginning in just the same way that a more formed judgment is related to a less formed one, the relation in both cases being one of growth as between bud and flower or child and man, and the line drawn between datum and conclusion being just as arbitrary as those we draw at the beginning and the end of the process as a whole. Having made these suppositions the next question is what follows if they should be true. In the first place, do they lead to any contradictions? And in the second place, what if they do?

The kind of contradiction they lead to is the same that we encountered at the end of last chapter in speaking of causation; the kind that attaches impartially to all attempts to understand a process which is admitted to be continuous. On account of its continuity we can only understand it so far as we can be content to leave our understanding of it incomplete. The effort to understand it involves an artificial separation of it into parts, both successive and side by side. Just as with causation, so with reasoning—if it be also continuous—we cannot observe its structure or composition unless we pick it to pieces and thus violate its unity, thereby doing it some injustice. And in both cases the only correction possible lies in our remembering this defect as a source of error, and so learning where to look for the points at which correction may presumably be required and applied.

Now, some help may be got perhaps from remembering that the inquiry for a definition of reasoning is the attempt to discover its *essence*. For then, if we accept the modern view of the nature of essence,[1] we can agree with both sides in this otherwise endless dispute. Since all distinction is purely an affair of purpose, we find no difficulty in admitting that there are purposes for which we are bound to make this particular distinction artificially firm and clear; and at the same time we need have no difficulty in finding another purpose which is better served by the consistent admission that, for all we know, instinct and reason may differ only in such ways that they are essentially one. The contrast is between the purposes of the psychologist and those of the logician,

[1] See p. 167.

and we may find that what is a difficulty from one of these points of view is only a relief when seen from the other. For while the former has to explain the distinction between reasoning and judgment, and has therefore to do each notion this kind of justified injustice, the logician is free from the need of attempting any such task. His business is, not to classify mental operations so as to emphasise their points of difference, but only to examine them so far as that helps him to see the nature and sources of error. The problem is, no doubt, set to him at first as the inquiry into the difference between good and bad *reasoning*, but if his solution of it extends a little further than to reasoning 'in the proper sense of the term,' where is the harm of that? His account of the nature of error is not necessarily or intentionally restricted to errors in reasoning as distinct from errors in simple judgment; the restriction to reasoning is, for the logician, only an accident, or a way of starting the inquiry at that end of the scale which is best open to observation. There is no loss, but rather a gain, if we are afterwards led to think that the sources of error are the same in the most deliberate and the least deliberate judgments, the same for the beast and the man. If it be so, we shall extend our insight into the working of higher and lower minds than our own, and some of the apparently miraculous character will disappear both from their wisdom and their folly.

§ 25.—The Weak Points of Reasoning or Judgment

Any piece of reasoning, we have seen,—keeping in view first only those cases which every one would

allow to be reasoning,—is syllogistic to this extent, that it involves both previous general knowledge and the present conception of particular facts under general names. If the desire for accuracy of conclusion drives us to analyse further in a given case, still the same two elements appear at every step. Our major premiss being questioned we attempt to show it as an interpretation (in the light of previous general knowledge) of particular facts observed (and conceived under general names). If our minor premiss comes under suspicion we seek to justify the predicate M by exactly the same procedure; S, we contend, has certain features (described again by general names) which give it a right (here previous general knowledge comes in) to a place in the class M. Accordingly it appears that all criticism of a reasoned judgment can avail itself of two points of attack, one or both of which may be followed up; and in following them up, however far we pursue the inquiry, the same two lines of objection are open until we can be satisfied to close them. Thus the risks in deliberate reasoning are due to (1) defects in our previous general knowledge, and (2) defects in our conception of the particular fact or set of facts from which the conclusion seems to follow. Even the most emotional sources of error—hope, or fear, or love, or hatred—can only take effect in these two ways. Gross errors may be accounted for by gross defects of either kind, but when we consider the kind of error that is really troublesome to detect and still more difficult to conquer permanently, we may trace it to the insufficient analysis (past or present) of some fact or facts observed,—a defect which has for its most intelligible cause the power of general names

to hide individual differences whose real importance happens not to be seen.

Now if we look at the judgments of the human intuitive seer on the one hand, or the dog on the other, what ground have we to assume that these two sources of error have suddenly disappeared in favour of others to which we have no clue? What *has* disappeared, at least explicitly, is the use of general names; and of reasoning without explicit general names we all have plenty of experience in person. The reasonings in a game of chess, for instance, are largely of this nature; we have a general name for the situation 'in check,' 'stale-mate,' and so on, but there are dozens of other recurring situations,—for example, in an end-game with kings and pawns only—where general names have not been invented and where they would be of great use to a beginner. But the errors we commit in the absence of general names are just the same as if we had applied a general name to a situation which did not fully deserve it. What other error, in fact, can there be than either (1) that we over-look or over-emphasise some detail in the situation, and so sum it up under a false general conception, or (2) that our previous experience is insufficient to show us clearly the meaning — the inevitable con-sequences — of a given situation? And the same holds not only in games but in all the most serious business of life. We are always having to deal with situations in the light of our previous experience, and we often have to do this without any accepted general names which can be used to sum up the situation as a whole.

Similarly with the scalded dog who dreads cold

water, or the stupid dog who learns from experience more slowly or more faultily than others. He too sums up a situation and its meaning, and in doing so he overlooks essential details, and gives undue weight to accidental ones, just as we all do when we lose a game of chess, or when we are tricked by a conjurer, or when we draw any false conclusion however deliberately. Fully admitting that we cannot quite get inside a dog's mind, and that our retrospection of our own hurried or inarticulate judgment is to a great extent impossible or delusive, may we not still expect that the mere presence or absence of explicit language can make no more difference to the sources of error than has here been suggested? If otherwise, where are we to look for any explanation of the ways in which a poet or an animal commits an error of judgment? None, I believe, has ever been offered by those who claim that reasoning and instinct are essentially different things. Instinct is a wonderful thing when it leads us right, but there is less occasion for blank uncomprehending wonder when instinct leads us wrong.

§ 26.—Some Objections Considered

Nevertheless a view of this kind cannot expect, and need not desire, to have an easy time or encounter no opposition. Arrayed against it there are on the one hand the frankly abstract and disjointed conception of reasoning which is encouraged by Formal Logic, and on the other hand the sturdy common-sense view which is inclined to suspect philosophy of causing needless inconvenience, or worse, through tampering with valuable distinctions.

Our virtuous horror of casuistry often overshoots its mark and suspects all refinements of thought impartially, the useful ones included. One may guess what Dr. Johnson would have found to say about Darwin's views, or Whately about Bosanquet's Logic. It is always tempting to end one of these discussions by the ultimatum that "After all, X is X, and Y is Y, and there's an end on't."

As to this latter line of objection, however, there is really no need to suppose that in our suggested identification of judgment and reasoning we are running any risk of doing away with the notion of reasoning altogether. We need no more do this than the Darwinians do away with the word 'species,' or than our common recognition of the fact that man's growth is gradual does away with the words 'child' and 'man.' It is one thing to explain a word as having a value only for certain limited purposes, and quite another to condemn the word as useless. There are times when we need to speak rather of accomplished facts than of their unfinished stages, but the unfinished stages exist nevertheless, and a view of them is for some purposes desirable.

And secondly, the chief purpose for which this kind of view is wanted is that of helping us to trace to their source those errors of reasoning which are subtle and therefore effective. The fact that those who are much under the influence of Formal Logic dislike our view is no doubt regrettable, but neither unnatural nor incapable of change. Just so the old order must always dislike and distrust the new, regarding it as little better than chaos. Our counter-claim is that the old machinery is cramped

and rusty, and the old view of the faults of reasoning clogged and hindered at every turn by debris that is better removed. Under the traditional system only the clumsier kinds of fallacy can be taken into account,—only the kinds that require least logical insight for their avoidance. For if it is reckoned (as by Whately) outside the province of Logic ever to raise the question whether the data of a given inference are true, the mental process by which a false inference is taken for true remains inexplicable; we have no account to give of it except that some rule of Logic has been transgressed. And then the inquiring spirit naturally wants to know whether perhaps the rules do not, after all, deserve a little judicious transgression. At any rate it is clear that a Logic which restricts itself to the supposition that facts are always correctly conceived has an extremely limited range of utility. What the less formal view of the nature of reasoning does is to lead us to look for the weak points of an argument in the conception of some fact on which the conclusion directly or indirectly turns,—directly when it is found in the minor premiss, and indirectly when it is among the supports of the major premiss (or a part of it),—however far back that search may lead us. The contention is that to explain the existence of error (other than the comparatively simple error due to careless interpretation of sentence-forms) in any conclusion, whether commonly called 'reasoned' or not, there must be faulty conception of fact at some earlier stage of the train of thought which ends in that conclusion. It can be so traced in cases where the reasoning is deliberate; it can often be suspected with some justification in other cases where language

is not expressly used; and what risk lies in suspecting its existence in all cases whether of the quickest or the dullest erroneous thought no one has yet tried to tell us. Indeed, how is it possible to conceive error as arising *ex nihilo?*

Meanwhile, we claim that we can in this way begin to understand how faults in reasoning occur,—a problem which Formal Logic virtually ignores, and which calls for solution most in those cases which Formal Logic leaves most out of sight,—the reasonings where some care is taken and where the faulty conclusion wears an appearance of correctness. These are the cases where Logic is specially wanted; if it declines to deal with them on the ground that such investigations are outside its province, we can only answer that it is a thousand pities that its province should be restricted to such a trivial field. Especially where Logic is called upon to help in deciding between different opinions backed by reasons, it must fail if it keeps to its old simple-minded supercilious ways. It is hard to convince an opponent at any time, but the only chance lies in going along with him as far as you can. If you are content to accuse him point-blank of breaking some rule of the Syllogism, or of needing to be reminded of the truth of the abstract inductive canons, you will never convince him of error. The error, if any, from which his conclusion suffers must be traced to its source. You must show him where and how it arose, the defects of his view of the case, the additional facts which he has overlooked, and which being added to those he has seen can hardly be denied to 'throw a new light on the circumstances.' Even for this reason it is a gain to recognise that all error is due to a lack of sufficient

light on the facts observed,[1] and that any point in dispute may be resolved into, or traced to, a question which of two different descriptions of a piece of fact is the less inaccurate.

On the other hand it may be freely admitted that arguments which raise no dispute as to the soundness of the conclusion may often come more naturally under the old conception of reasoning as a process of building a structure by putting together isolated bricks of thought. Chief among these are, no doubt, mathematical reasonings—which, as we have seen, may be treated as a class by themselves. But a careful search will also bring to light a certain proportion of other cases where we get a piece of knowledge, and then another piece of knowledge, and then suddenly see that these are premisses and yield a logical conclusion.[2] Such examples, however, have little or nothing to do with an inquiry into the difference between good and bad reasoning. Conclusions which no one would dispute, like conclusions which every one would reject, fail to illustrate any of the real difficulties of the problem, and therefore do not call for refinements of explanation. It is

[1] In saying this we are excluding all cases of confused reasoning or judgment which involve a downright failure to connect the evidence with the conclusion; where, for instance, instead of proving the disputed assertion you prove another which is not disputed, or where instead of proving it you assume its truth in some disguised form and then deduce its truth from that assumption. These are exceedingly common controversial tricks or failures, and in a work on controversy, rather than on Logic, they would require treating at some length. In the present book, however, there is not much that need be said about them, except so far as the habits in question vitiate certain logical doctrines. See also § 28.

[2] Mr. Bosanquet (*Essentials of Logic*, p. 140) quotes from Thackeray an example which may serve to illustrate this case:—"An old Abbé, talking among a party of intimate friends, happened to say, 'A priest has strange experiences; why, ladies, my first penitent was a murderer.' Upon this the principal nobleman of the neighbourhood enters the room: 'Ah, Abbé, here you are; do you know, ladies, I was the Abbé's first penitent, and I promise you my confession astonished him.'"

chiefly when we keep in view arguments where the faults of the conclusion are not easily discovered that it becomes important to trace the error to its source in earlier stages of the judgment.

§ 27.—The False Duality of the Premisses

The unity behind the apparent duality of the sources of error in reasoning may, however, best be seen by recognising that questions of fact can only roughly be separated from questions of theory. This will come out more plainly in Part II., which deals specially with statements of fact and the difficulties they encounter in achieving accuracy and escaping vagueness; but at several points already we have had glimpses of the nature of the relation between theory and fact,—a complex relation of warfare and mutual aid. The struggle between them is one of the fundamental troubles of human thought, and our efforts to deal with it are precisely co-extensive with our efforts to gain increased knowledge of any kind. Every piece of supposed new fact we discover has in the first place to stand against the criticism of our previous theories as to what is possible, and in the second place whatever part of it survives this criticism reacts upon the store of general knowledge itself; some generalisations are confirmed by it, while others are modified or upset. One aspect of this rivalry claimed our notice in chap. i. (p. 43), where we saw the effect of an extension of knowledge of particular cases in raising a question whether a familiar definition ought to be widened, and the consequent effect upon a rule which needs interpretation. It matters not whether the rule be an

attempt to state the universal connection between X and Y—as in the half-truth that all swans are white—or on the other hand a rule laid down for some kind of human convenience, such as an Act of Parliament or an agreement of international law. Generalisation of any kind, in so far as it aims at precision, is liable to this increase of definiteness through the consideration of doubtful instances. For whether the rule be enlarged so as to take in the doubtful instance, or limited so as to exclude it, in either case both the rule and the instance have moved forward a step towards more precise conception.

Another aspect of the same relation between fact and theory is seen in the doctrine (p. 20) that the meaning of any general statement lies in its application to particular cases. The possible facts to which a theory refers are nothing else than the possible applications of a general statement. They are at once the matter (or meaning) of the theory, and, by means of the doubtful instances, the force which moulds it into better and clearer shape. By checking here and enlarging there they are always pulling down the less secure parts of the structure, and rebuilding with better material.

In chap. ii., and again in chap. iii. (pp. 98, 99), we reached a rather more difficult view of the way in which fact and theory (or minor and major premiss) are bound up together, so that the question whether the 'fact produced' is true, and the question whether it is revelant, can hardly be called separate questions. We saw that, in the case of the more disputable conclusions, these two questions tend to become one. Or if we still prefer

to regard them as two questions, at least we have to admit that neither of them can be answered carefully without also answering the other. In order to judge what caused what, in a given occurrence, it is necessary that our facts should be correctly observed and conceived; but since our conception of any fact is also dependent on the state of our general knowledge, progress in either of the two lines of inquiry involves and demands progress in both. The more difficult it is to make sure whether a fact produced has been sufficiently analysed into its details, the more difficult it is to locate the fault of the reasoning in either premiss taken by itself. The grosser the faults of an argument are, the more easily can we put our finger either on the false fact or the false generalisation.

§ 28.—Syllogism and *Petitio Principii*

A further view of this truth may be obtained by a glance at the old puzzle whether the Syllogism involves a *petitio principii*.[1] That a given syllogism may, but need not, beg the question whether its conclusion is true, is now admitted by every logician

[1] A translation of the phrase *petitio principii*, or 'begging the question,' may be given in several ways, perhaps the simplest being 'surreptitious assumption of a truth you are pretending to prove.' But this of course does not carry us far in tracing the trick into its more effective forms, for the effectiveness of any trick depends on its assuming a good disguise; and thus the inherent tendency of tricks is to depart from the recognised type so far as appearance goes, in the hope of eluding detection. And since arguing by means of expressed syllogisms is widely discredited nowadays, question-begging chiefly occurs where nothing like formal proof is set out, and where it might better be called the surreptitious assumption that *a doubt is solved* than that a truth *is* proved,—since the latter expression seems to point too exclusively to the case where an explicit conclusion is backed by explicit reasons.

With this confusion or trick we have already made some acquaintance in two of its commonest forms: the attempt to satisfy a request for a definition by means of a mere translation, and the attempt to defend a shaky assertion by making it purely abstract.

who understands the difference between begging a question and raising one. The two operations are, no doubt, easily confused; but all that is necessary to keep them separate at least in idea is to remember that no assumption amounts to question-begging unless it is surreptitious. A syllogism begs the question only where the pretence is made that an unadmitted premiss is (or must be) admitted. In the absence of this pretence there is no question-begging, for then we are either openly asking whether the premisses are admitted—and if they are not, the question at issue changes—or else we are openly assuming the truth of the premisses 'for the sake of argument,' and leaving perfectly open the question whether they are true as a matter of fact. Open assumption is not only legitimate, but necessary for all progress of knowledge;[1] to assume openly the truth of a statement is properly no more than to ask whether it is true,—to guess in the hope of verifying, or to state in the hope of disproving. In the legitimate use of reflective syllogism the reasoner would be the last to deny that the premisses taken together are only a re-statement of the conclusion in an expanded form. No claim inconsistent with this admission is made for them. And the re-statement has an obvious purpose. By thus breaking up the conclusion into rule and application we do two things: we lay it open to a more definite attack than before, and we make an attempt in the direction of showing causation behind it.

[1] Otherwise whoever disliked a given conclusion could at once reduce to futility the best possible reasons for accepting it; indeed, the better they were the more they would be open to the charge of question-begging *in this sense*. Only a poor kind of Logic could be satisfied to make our own preference for or against a conclusion the test of the force of the reasons given for it. Not by this method has knowledge ever advanced.

As admitted already, a given syllogism *may* contain an attempt to beg the question. But it is difficult to conceive any examples of this trick that do not depend on an ambiguity of the middle term. For in order to beg the question, the premisses must of course seem true,—else the question as to their truth might arise, and that (we are now supposing) is the very point which is to be slurred over as much as possible. And the chief occasion on which premisses seem true when the reasoning is unsound is where each premiss taken by itself is true in some sense, but the two taken together are false. The statement, for instance, that *money is wealth* is true enough if taken loosely and not connected with the maxim that the accumulation of wealth in a country is an economical gain. But to take these two statements together and use them in support of the 'Mercantile System' is to pass too lightly over the question whether money is wealth in just the sense required.

On this account it is only in arguments of the simplest and least debatable kind that the reliance on syllogistic proof is *not* a suspicious circumstance. The more arguable a question is, the more we may expect to find that any apparently simple syllogistic solution of it contains an ambiguity of the middle term. In such cases the term M is a clumsy or superficial description to apply to S, a word which hides the real complication of S's nature under a misleading verbal simplicity. S *is* M, in a sense, else the false conclusion would not seem true; but it is also in some sense *not* M, else the dispute would not have arisen. The question remains whether S is or is not M in just that sense in which it is true that from M follows P. There is only one way to

approach the settlement of such a question, and that is to enter upon an inquiry into the details of the fact S, and at the same time into the precise interpretation of the law that from M follows P.

It appears, then, that a syllogism only escapes involving *petitio principii* when the question is left open whether M is ambiguous. Actual question-begging under cover of the syllogistic form is a special result of neglect of the risk of ambiguity in the middle term. To neglect this risk is to ignore the subtle change that comes over the meaning of two statements when they are put together and reviewed in the light of a particular conclusion which they are supposed to guarantee. The major premiss or statement of theory, and the minor premiss or statement of fact, determine each the meaning of the other; and by ignoring this we may surreptitiously claim truth for a proposition which is false.

The effect of each premiss on the other is to make a vague meaning more definite. When the general rule 'All M are P' is interpreted so as to include the case S, it takes on a more definite meaning than it had while this application of it was not clearly foreseen; and its truth becomes accordingly more difficult to establish. In the same way the statement of fact that S is M loses some of its vagueness and irresponsibility when M is expressly defined as the M which indicates P. Any statement whether of fact or of theory gains in definiteness, and so loses in easiness of acceptance, by being tied down to a particular interpretation. In this way statements which, taken in isolation from each other, legitimately pass for true, may when combined as premisses be false and so support a false conclusion.

§ 29.—Transition to Part II

The conception of theory and fact as each dependent on the other presents, of course, some difficulty,—of a merely verbal kind, however,—since we are too apt to think of the acceptance of a fact, or of a theory, as a sudden act once for all performed, instead of as merely part of an unfinished movement of thought. It is only where X is complete before Y comes into existence that the axiom that Cause precedes Effect can be appealed to as forbidding the interdependence of X and Y; two things which grow simultaneously may help forward each other's growth, as with the widening leak in a dam and the trickle or rush of the water through it. In such cases, to study the growth of the one feature is also to study the growth of the other, and it scarcely matters which we choose expressly for investigation. Part II. will therefore begin with the inquiry what is involved in the process of *predication*, or statement of fact; and the discussion of certain natural errors and half-truths which are always in danger of being trusted beyond their legitimate use will lead us to a fuller understanding of the nature of ambiguity and its remedy, definition. Reasoning, it has here been suggested, is not best explained as a mechanical placing together of premisses out of which a conclusion is pressed, nor even as a marshalling of undeniable facts out of which a theory is built by any facile process of "dropping out of sight their accidental features." It is rather a process of letting a half-formed judgment grow, in the bracing and cleansing air of criticism directed upon the supposed facts appealed to. The whole purpose of repeating

observations or experiments is to allay the doubt whether the 'facts' were not somehow misconceived. That is why the search for a definition is not merely a game for quibblers and the 'choppers of Logic' to play at, but is the most important factor in all attempts to guard our reasoned judgments from error, whether in scientific discovery or in the affairs of daily life. And that is why it is necessary for the student of Logic to get as true a conception as possible of the nature of this process and of the nature of ambiguity—the defect which the search for a definition tries to remedy. We have seen that all false judgment involves false conception of some fact or facts; that the kind of false conception which is least easily avoided is where slightly too much or too little importance is given to one of the circumstances present in a complex fact—for instance where the intelligent foreigner only slightly exaggerates the less respectable motives of England's foreign policy, or only slightly underrates whatever other motives are concerned in it. The farther we get from the lower end of the scale, where the falsity of the explanation is gross and obvious, the more evidently the fault consists in giving a wrong name to a complex fact, or in conceiving a complex fact too simply. In a fact containing the elements X and Z, the X element may be singled out and noticed undeservedly; the fact as a whole is taken as being more simply X than it is, and thus the weakness of the explanation consists in forgetting one of the subtle ways in which a name may be wrongly applied. Even low down on the scale this account of the fault begins to be intelligible, though it is there less clearly appropriate. For instance, where

the child imagines that the watch was opened by blowing on it, we should naturally say that he totally mistakes the nature of the occurrence,—puts down the effect to one thing while it was really due to another. But it would also be strictly correct to say that he has a complex fact before him, consisting (among other things) of the obvious blowing and the less obvious pressure of the finger on the spring, and that he conceives this complex fact too simply through overlooking one of its details. Fortunately, however, we need not compel ourselves, in cases so low on the scale, to decide between these two ways of viewing them. It is enough to recognise that the more nearly true a false explanation is the more naturally it may be viewed as a case of false balance between more and less obvious factors in a complex fact.

To Logic, therefore, the need of recognising faulty description as a highly practical danger, and the demand for strict definition as liable to become of extreme importance at any moment, is, as we shall see, of the most far-reaching kind. With this recognition comes a radical change in our view of the nature and effects of ambiguity. It is no longer a merely academic blemish which may be put out of consideration as of small practical importance owing to its rarity. Definition and Classification are no longer subjects which can be perfunctorily treated, even in a textbook. Discussion of them becomes rather the core of any logical teaching which aims chiefly at understanding how faults in a reasoning process arise and what makes them most effective.

PART II

DESCRIPTION AND AMBIGUITY

CHAPTER V

DESCRIPTION, IN GENERAL

§ 30.—Description involves the Use of Class-Names

Since incorrect reasoning involves incorrect description[1] of the facts from which the reasoning proceeds, it follows that in discussing generally the ways in which facts come to be falsely described, or misconceived, we are directly approaching the central problem of Logic. Now among the sources of misconception of fact the (tacit or express) use of words admittedly holds an important place, and is at the same time the only one that at present seems to allow of general treatment. The precise effect of our other and less avoidable mental or spiritual disabilities is to some extent—owing to those disabilities themselves—beyond our ken; and even where it is not so it varies too much from person to person to come within the scope of the present inquiry, which gladly accepts to that extent the traditional limita-

[1] The word 'describe' is here used to include 'conceive.' To conceive a fact is to describe it tacitly; to describe a fact is to give expression to a conception already formed. We may therefore use either word indifferently, except where there is any need to distinguish between express and tacit reasoning. Again, the distinction generally made between description and explanation is here neglected as irrelevant, since description is incomplete in so far as it is not explanatory.

tions of Logic. We may in the meantime be content with a less hopeless branch of knowledge. The snares and shortcomings of language—the price we have to pay for the convenience of using words—these are subjects more or less forced upon the notice of everybody at times, and they have rightly been recognised as important ever since Logic first turned attention to them. What we are now to do is to find fault with some of the leading generalisations about the nature of description which have been reached by common sense and adopted with insufficient criticism by the traditional Logic.

The most elementary truth about description is that it cannot be performed otherwise than either by means of class-names—also called in Logic 'general names'[1]—or by names which though not commonly used as class-names yet take on the characteristics of class-names when they are used to describe. To describe anything is to make what is technically called a 'predication' (or predicative assertion) about it; and the 'predicate term' of a predication —that term by which the describing is done—is always either an obvious class-name, whether substantive, adjective, or verb, or a combination of such, or else is a proper name turned into a class-name for the time. Thus if we describe Smith as a traitor, or as treacherous, or as betraying his party, we are evidently classifying him (or his actions); while if we describe him as 'a Judas' we are still classifying him, but less evidently. In the latter case we probably mean that he is a particularly treacherous kind of traitor; whenever a proper name is used in this manner it amounts to saying that S (the

[1] The usual account of these is discussed in § 54.

'Subject') belongs to an imaginary, unnamed sub-class within a larger class roughly indicated. A further account of the latter mode of description will be more in place in § 37.

These verbally simple instances of the act of description must not, however, be allowed to occupy our attention exclusively. If typical at all, they are typical rather of the elements into which actual cases of description may be analysed than of acts of description generally. For in the first place, description—especially where accurate description is attempted—is more often than not many-worded; and then is more naturally viewed as a group of predicative statements, each modifying the other, than as what Formal Logic naïvely calls a single proposition,—like 'Smith is a traitor,' or 'Socrates is mortal.' The distinction between 'one' proposition and two or more propositions taken together is of the most external and superficial kind.[1] No limit can, in theory, be set to the complications that are possible within a single assertion. But since in complex predications some parts are more open to criticism than others, it is usually necessary to break them up into portions—of quite irregular size however—which can be considered separately.[2] In this way any complex predicate is merely a bundle of simpler predicates each of which is either a class-name or meaningless.

[1] In fact, since every predicate term is definable by *genus* and *differentia* (or since every P = DG), it follows that 'S is P' always contains the two propositions 'S is D' and 'S is G.'

[2] The confusion that may result from not doing so is exemplified in such phrases as 'believing the Bible' or 'believing Darwinism.' One might as well speak of believing philosophy, or believing the newspapers. Criticism gains more by breaking up apparently simple assertions into their component parts than by reversing the process.

And in the second place, statements which have an obvious Subject term, such as Smith or Socrates, do not well illustrate the usual manner of stating—*i.e.* describing—facts observed. Though description of fact is essentially a predicative operation, it is often not easy or natural to throw it into any form which distinguishes Subject from Predicate. Not only in hurried statements like 'Fire!' or 'Thieves!' or in cases where (*e.g.*) 'It is raining') the extent of the Subject is too vague to be specified, but also in a very large number of the most ordinary statements of fact the Subject term, as such, either needs no expression or for some reason finds none. A fact observed is very commonly an event — something that takes place—a change that occurs in circumstances taken as approximately known; and then we naturally do not name these circumstances as S, and describe them as having become P, but we take the S for granted and merely speak of the change itself. We should naturally say "There is a shooting star," or "It is getting lighter," rather than use some sentence in which (*e.g.*) "The sky" would be the subject term. In other statements again there are two things so equally spoken of that the question which is Subject and which is Predicate is not easily answered. If I say that the motor car is supplanting the horse, it is not clear—and can at most be guessed from the context—whether motor cars, or horses, or both, are the Subject.

Instead, then, of taking 'S is P' as the type of descriptive assertion, we may regard it as only one among other forms appropriate for that purpose. To call it specially the 'logical form'[1] means no more

[1] See chap. x.

than that it is the form on which the machinery of the Aristotelian Syllogism is based; and that machinery has perhaps retained and cheapened the name of Logic too long. About the process of description the truth which has special logical importance is that we cannot describe anything without using class-names (or other names temporarily made into class-names) by which to perform the operation. In order to be descriptive at all a name must have all the qualities and defects of a class-name, and we shall presently inquire more closely what these are.

§ 31.—All Statement of Fact is Description

But first there is a point which needs a little discussion,—the question how far, or in what sense, it is true that all statement of fact is description. Common sense is inclined not to admit any such thing, but rather to assume that the descriptive statement of a fact is somehow different from its bare statement, the former being partly imaginative like a painted portrait, while the latter is plain and straightforward like a photograph. This is one of the many cases where an abstract distinction with a certain rough value works mischief when we forget its abstractness and so trust its applications unguardedly. The unsatisfactoriness of the assumption that any fact, as known to us, is bare fact, has been already briefly noticed above,[1] but it may be seen still more clearly if we try to imagine any apprehension of a fact which does not also involve conception of it as having such-and-such characters, or to imagine any real difference between conceiving facts and interpreting facts by means of theory. No

[1] Page 93, and § 27.

doubt a use may be found for this distinction,—as is shown by its wide acceptance. Vague though the distinction may be, its very existence shows that it has some value. No doubt we should naturally talk of interpreting facts when the facts themselves are taken as certain, and of conceiving them when they are the kind of facts that can evidently themselves be misunderstood. For instance, if we see a man running, and we try to account for the fact by supposing that he has just committed a theft, or that he wants to catch a train, that would be an attempt at interpretation; while if we see a dim object in the dusk, and are uncertain what it is, our efforts to account for it would be called an attempt to conceive the fact. The vaguer the fact itself appears the less easily can we talk of its 'interpretation.'

But this only changes the form of the difficulty, by raising the question which facts are really certain. If a complete answer to this question could be found, there would be no further use for Logic, or indeed for any kind of science. It is just because all our supposed facts contain a mixture of more and less deniable elements that any mistakes are made. And it is of course because mistakes are possible that science has a value.

The possibility of error existing in the supposed facts themselves is what shows that the so-called conception of fact is only a case of quicker and less conscious interpretation. The facts themselves cannot be untrue; the only thing that can be untrue is the account we give of them,—whether we call it conception or not. Suppose the case of a man frightened by having a revolver pointed at him; he rapidly forms the judgment 'Danger,' in consequence of a fact

which (you may say) he first conceives and then interprets. But the conception itself is an interpretation, and, if for instance the revolver happens to be unloaded, a wrong one. There is *something* true in the fact, for we have supposed that the object really is a revolver; but there is also something false in it,—namely the theory which makes the fact what it is for the frightened man. And however extreme we make the instance the same result will be found. I have heard of a railway passenger who went so far as to pull the alarm-signal and stop the train because a harmless fellow-traveller took a bicycle-pump from his pocket and looked as if he might be going to point it at her. Some of her fact was correct enough; the object really was a shiny metallic cylinder with a sort of resemblance to a pistol barrel. But so far as the fact was false the error arose through misconception or misinterpretation, whichever we choose to call it. Similarly all recognition of fact as such-and-such a kind of fact involves interpretation of a part of it, which is also itself a fact recognised and therefore itself compounded of fact and theory; so that we never really get down to the bare fact on which the structure of theory is built. We call a fact bare only when we have stripped from it that part which seems to ourselves to be theoretical. The only kind of conception of fact known to us, or imaginable as existing, is that which builds a structure of more deniable theory upon a basis of something less easily denied.

The student would find it a useful exercise to try to imagine any cases of false observation which are not cases of false theory, false conception of the nature of the fact observed. In what direction is he to look for them? Certainly you can find *true* facts,—or what

pass for such with all of us,—facts in which the theoretical element, though it exists, escapes our own recognition; but the moment you imagine an observed fact to be false you cannot help imagining it as a true fact falsely conceived or interpreted. If our description of a piece of fact is inaccurate the inaccuracy can only consist in a false theorisation of that fact, a false estimate of the nature and relative importance of the details composing it. That there *is* a fact, composed of details, is always true; untruth only begins with our account of what those details are and what notice they respectively deserve. In denying a fact we never deny that *something* is true; we only deny the accuracy of the account that is given of that something; certain details are overlooked or are given too much importance. It is in this way, then, that all statements of fact are descriptive. Whenever a fact is stated at all, but more especially[1] when it is produced as evidence for a conclusion and so is taken as having particular consequences, its truth may be examined on exactly the same lines as that of the simplest possible predication about a Subject.

[1] Although, strictly speaking, all description or conception is for the sake of inference, we may here adopt the looser expression without any harm.

CHAPTER VI

THE NATURE OF CLASSES

§ 32.—Meaning of the Word 'Class'

If it be asked why it is important to recognise that description can only be performed by means of class-names, or other names used as class-names, the answer is that in the light of this recognition we can best understand the defects to which all description—and therefore all statement of fact—is liable; the faults which remain to cause confusion and error even where the faulty description seems most accurate. But the clearness of our view of these defects greatly depends upon our view of the nature of classes, and there are few subjects about which the habits of common-sense thought—encouraged by Formal Logic—are more confused and self-contradictory. For reasons which will be discussed in the next chapter, our natural tendency is to overlook or forget the fact that class-names inevitably have a quality in them which is the parent of ambiguity; and the result is that only the coarser and less effective kinds of ambiguity obtain recognition.

The word 'class' is so commonly used that it can hardly be thought to require translation. Still, it is often taken in too restricted a sense. Social divisions,

even vague ones like that between rich and poor, are of course always recognised as class-divisions; so are those between classes in natural history, like 'vertebrates,' 'mammals,' and hundreds more; but many groups of persons or things are commonly spoken of by other names, such as race, or nation, or breed, and there may be some people who would hesitate to use the word 'class' in cases of this sort,—to apply it, for instance, to human beings in general, or even to Englishmen or negroes. Still more unusual is it to speak of substances[1] like gold or wood or stone as classes; or again of abstractions like deceit, adversity, or excellence. These latter are often conceived as names of attributes[2] rather than of classes.

The first of the above three kinds of restriction on the meaning of the word 'class' has never been adopted in Logic, but logicians are often under temptation to support the other two. For our purposes, however, all three may be disregarded, since the truths which we are here concerned with hold good of classes not only when the word is taken in one of its narrower meanings but also when it is applied to any group with special characteristics, whether (*e.g.*) a race of men, or a substance divisible into parts, or an attribute which occurs in different individual cases. By a class will here be meant any imagined group of individual cases, whether material things or immaterial, whether real or unreal,—a group in which every individual is supposed to resemble all the others in some respects though differing in others. There are classes of actions and events, just as of anything else; 'miracle' is a class-name, for instance; or 'coronation,' 'battle,' 'eclipse'; in

[1] See end of § 54. [2] See § 56.

fact, any name which is used so as to admit of a plural, — either simply, as 'miracles,' 'negroes,' 'battles,' or in the more circuitous form of 'pieces of gold,' 'cases of deceit,' and so on. If a word which was, or is, a proper name—say Hooligan, or Jingo—acquires a plural form, that is grammatical evidence of its having become, in certain uses, a class-name. By English grammar, adjectives in a plural form, such as 'radicals,' or 'imbeciles,' are generally considered to have become (in that usage) substantives; but adjectives, as such, are class-names, even when we have to supply a word like 'persons' or 'things' to make them plural. Verbs too are class-names; for a verb may at any time be used as a predicate, and when so used it is always translatable into the 'logical form' which separates the predicate itself from the mere sign of predication;[1] and the predicate thus separated is plainly either adjectival or substantival, whichever we choose to call it.

§ 33.—Ancient and Modern View of Classes

A comprehensive short account of the defect of the popular view about classes is that it conceives them too rigidly, recognises too little that the grouping is imaginary, changing with the changing purposes for which it is wanted. But since this false conception shows itself in various special ways we shall learn more about it by considering some of these separately. Among them may be noticed, for example, a disinclination to recognise any artificial element in 'natural' classes, or to admit the continuity of Nature, or to admit that all classes are indefinite.

[1] See § 58.

Or again, indefiniteness and ambiguity are commonly taken for the same thing, and while some words are recognised as suffering from this defect, it is supposed that others are entirely free from it; and—among the latter kind of words at least—the 'correct meaning' of a name is a common object of search, and once found it is held to constitute an impassable barrier for thought. For example, if the class 'man' includes in its general definition some particular attribute X, then it is supposed that the question whether men ever existed without X cannot even be asked, since it involves a contradiction in terms.

The example just quoted is perhaps rather extreme, for the present day at least. And indeed to find these views flourishing quite freely we must go back to the Logic of the early Middle Ages when the Realists were the dominant school of thought,—when, for example, it was assumed to be an easy matter to say which attributes of a class really belonged to its 'essence,' and which were only 'properties,' and which were 'accidents.' For in those days man had hardly begun to be aware of the extent of his own ignorance of the facts and the laws of Nature, and accordingly the real difficulties of definition were kept in the background without any effort. Natural classes, it was then habitually supposed, had no dependence upon man's way of regarding facts. The received idea was that natural classes were simply made *for* man, and made with clear-cut edges; and that man had nothing to do but to accept them and learn their names and their definitions. Doubts as to the application of a class-name were supposed to be the fault or misfortune of the doubter, not of the name. And even when it was admitted that the

original invention of the names was of human origin, still the process was conceived as scarcely more than that of finding suitable labels for things 'brought to us' ready sorted, like the beasts in the Garden of Eden. It is not easy for a modern man, however unphilosophical, to put himself completely back at this point of view, but he may come nearest to it by observing the ease with which a child will accept merely verbal explanations.[1] The more childish we are, as individuals or as a race, the more content we are to accept classes and class-names as given facts without further inquiry.

But the half-truths of the present day are what we are here specially concerned with, and the older forms of them are of interest only so far as they help us to see more clearly the gradual change of view that is still taking place, and to explain the less careful existing views as survivals. That, however, is by no means their whole explanation, and does not quite account for their vitality. Under all their various forms we may also see a better excuse for them than either mere ignorance or a disinclination for original thought. For they are all directed against verbal quibbling, and their good intention fails chiefly because of a certain lack of discrimination which leads them to carry on the war clumsily and with an excess of zeal.

§ 34.—False Interpretations of the Modern View

For instance, when the artificiality of classes is spoken of, common sense remembers that artificial

[1] This is quite apart from the habit some children acquire of aimlessly playing the game of asking 'Why,'—*e.g.* "*Why* is Grannie old?" The latter kind of questions seem to have little to do with the search for knowledge.

and natural are sharply opposed ideas, and remembers also that the distinction is actually in use for the purpose of marking off two contrasted types of classification. It is only, of course, the doctrine that *all* classes are artificial that common sense rebels against. That some classes are so every one would allow, for we know all about the way they were made,—the class 'peers' for example, or any classes that depend upon distinctions which are evidently an affair of human convenience from beginning to end; such as our classes of weights and measures, or the distinctions between coins of different value, or between kinds of railway carriages. In all such cases it is easy to see that a slight difference of purpose might alter the classification considerably,—we may adopt the metrical system, or a decimal coinage, or abolish second-class carriages. But the plain man distrusts and dislikes the idea that *natural* classes can be in any sense artificial; he suspects a sophistry on the part of those who tell him so, and imagines they are going on to prove in over-ingenious ways that everything is something other than it is, and to pretend that vulgar superstition is the sole explanation of the widespread belief to the contrary.

And no doubt there is some excuse for this suspicion, quite apart from any desire on the part of common sense to find philosophy absurd. If we look at the phrases in which the modern view of classes has from time to time found expression we may readily admit that they are not quite satisfactory. But that is everywhere the way with concise expressions,—as a rule they lie open to caricature and misrepresentation. It would be better therefore to

use these short phrases as little as possible, at least until we recognise clearly that the sense in which they are to be taken is one that need not cause offence or impatience.

For example, to call classes artificial does not mean that there is nothing natural in them, or even that they lack reality or importance. We are not asked to suppose that class-names are invented for mere amusement or for want of something better to do. Nor are we called upon to condemn as useless for all purposes the convenient loose distinction that is commonly made, under the terms artificial and natural, between classes which are arbitrarily formed and those which are not so. There are evidently some—the class 'gold,' for instance, or any of the other supposed chemical elements—which seem forced upon us as objective facts. So far from there being anything arbitrary in forming the class gold and drawing a firm line between gold and other metals, it has been the desire of man for centuries to break down this line of division, and he has never yet been able to do so. That there are in this sense natural classes no one can dream of denying. To say that all classes are artificial must therefore not be taken to conflict with the admission that some classes are, for all practical purposes to-day, conspicuously definite and unlikely to need any change of definition to-morrow. Natural classes, as opposed to artificial ones, can only mean those the precise limits (the dividing lines) of which are so clearly marked that as Mill[1] says, "it is not optional but imperative" to recognise them; or in other words, that difficulties of definition cannot arise. And when we ask which in fact these

[1] *Logic*, book i. chap. vii. § 4.

classes are it is evident in the first place that our answer must depend a good deal on the standard of clearness of division we happen to be using. There is no one standard of clear division, as opposed to rough division, which can be used on all possible occasions, unless indeed we decide to call only those classes 'natural' in which the drawing of the line is a matter *entirely* outside human control. And then we should be raising a question—the question which these 'imperative' classes are — that cannot be answered until that infinitely distant day when we shall know for certain that the progress of knowledge has come to an end. Moreover, so far as the difference between good and bad reasoning is concerned there is nothing gained by asking how many of these fortunate words a rigorous search would discover, nor need we dwell on the difficulty there would be in drawing up any list of them so as to satisfy at the same time those who know much and those who know little about the things to which the names belong. Suffice it to notice that if any name were really safe against future changes of definition then it could not give rise to those occasions of difficulty which are of special interest to the theory of Logic as contrasted with common sense. From the point of view, therefore, which is taken in the present inquiry, such names (supposing they exist at all) would be the least interesting or important class-names of any. Since their application as predicates is never doubtful they cannot illustrate effective errors of description. In order to do that, we must consider the normal class-name, which is always a highly artificial instrument.

Nor again must we suppose that to call a dis-

tinction artificial is to condemn it outright.[1] Even though artifice involves pretence, it is a kind of pretence that may be of the utmost value,—the kind of pretence that has a legitimate purpose and is not afraid of investigation; the kind of pretence indeed without which thought could scarcely exist. To recognise that predicate terms depend on artificial distinction is certainly to recognise that their application in any given case is disputable; but to call an assertion disputable does not mean that it must be untrue, or even that we are bound to dispute it in season and out of season; it only means that *when* a doubt has arisen whether S is P or only seems to be so, we are at liberty to recognise that S can only be called P for reasons of some kind, and that such reasons may perhaps not bear close investigation.

Similarly the doctrine that Nature is continuous throughout must not be taken in any of its obviously foolish senses. Some people seem to fancy that what is denied is the existence of differences in Nature. There could not be a greater mistake; nothing of the sort can ever have been seriously intended. Rather, we start with the free admission that Nature abounds in differences, and indeed that there is no 'distinction without difference' except in the sense that some differences are, for a given purpose, unimportant, and may thus become negligible on occasion. Even where the line between two classes is at its haziest the difference between two classes is a real fact in Nature; what is not real but artificial, in these cases, is the sharpness of the distinction. For instance, wealth is a different thing from poverty, however gradually the change occurs in a given case.

[1] See also p. 101.

Nor again is this view bound up with any particular theory of the course of evolution in Nature; we may admit for instance that between living and not-living matter none but an artificial line can be drawn, and yet confess our ignorance of the earliest origin of life;[1] it is enough to recognise that dead food every day becomes the living body. The general question as to the origin of life lies entirely aside from the admission here required, although no doubt the recognition that classes are artificial paves the way for many such special inquiries into the course of Nature,—inquiries which could otherwise never be begun.

And the doctrine that class-names have no 'correct' meaning needs even more care in interpretation. The mental attitude against which it is directed cannot be entirely condemned, since it depends upon qualities useful at least in childhood; and its chief defect is that like other useful early habits it so often survives its uses and clogs the mind of the man. Therefore when we protest against the assumption that words have a correct meaning it is never intended to deny that there are words whose meaning remains almost constant, and about which most people are usually agreed; nor to deny that some definitions of a word are better—more useful or less misleading—than others. We may fully admit that dictionaries and textbooks give valuable information of a kind, and that the inquiry after the accepted sense of a word is a legitimate inquiry and in some ways important; we may fully admit also that the world is on the whole wiser than the individual, and that therefore the accepted sense of a word carries a presumption in

[1] Or even, with Prof. Ward (*Naturalism and Agnosticism*, vol. i. p. 261), of whether it ever did originate.

its favour. In fact, when we say that there is no such thing as the 'correct' meaning, all that we need really intend is that the meaning of a name, however widely accepted by the best authorities, is an unsatisfactory source from which to learn the facts about any particular case in which the name is applied. For inexact purposes, or for some elementary educational purposes, it may be a help; but it is certainly also a hindrance to the progress of knowledge, and if it were taken seriously and used with thorough consistency it would be an absolute bar to progress. When any peculiarity in the usage of a word is a help in expressing or seeing a truth, it is not the logician but rather the schoolmaster who should raise objections.

§ 35.—The 'Laws of Thought'

The point just spoken of will best be understood by reference to the traditional axioms which are known as the Laws of Identity, of Contradiction, and of Excluded Middle—principles which still occupy a prominent position in logical textbooks, and are supposed almost to explain themselves at sight and to serve as a solid foundation for Logic generally. The first of them is usually expressed as 'A is A,'—for example, Black is Black, or White is White. There could hardly be a more respectable axiom at first sight. We have here a proposition of the familiar form S is P, with the difference that its Subject term and its Predicate term are the same. But, just as in the case of Jevons' principle of the Substitution of Similars, there are two direct ways in which such a sentence may be interpreted;[1] and one of them makes

[1] Of indirect ways there may be an infinite variety. In some of the best modern treatises the old names of these Laws are preserved for truths of a

it an empty truism, a purely abstract statement devoid of all application or meaning, while the other makes it an exceedingly loose and misleading half-truth. Just as Jevons' axiom speaks either of things which are really alike or of things which are taken to be alike, so the Law of Identity speaks either of things which are really A or of things which are taken as A. But what meaning is to be found in the statement that things which are really A really are so? How does such a statement either conflict with or confirm any possible theory about the nature of a thing which happens to go by the name of A? In order to be an assertion at all, and at the same time not to beg the question it professes to answer, it must speak of actual cases *called*[1] A (*i.e.* taken as A), leaving the question open whether they are correctly so called or not. Thus 'So-called A is really A,' or 'No mistakes are

much more elaborate kind. That something of these deeper truths may have been dimly seen by the philosophers who first put forward the Laws is a possibility which no one can exactly deny, and which is in any case chiefly a matter of personal or historical importance; for we can admit the truths without torturing these Laws into expressing them. For instance there is no difficulty in admitting, with Bosanquet (*Logic*, ii. 207), that "in spite of or in virtue of the differences expressed in a judgment, the content of judgment is a real identity, that is to say, has a pervading unity." But I venture to think that the students who read the textbooks are not in the habit of connecting any such meaning as this with the statement that A is A; and the textbooks give him no help towards doing so. Again, why should this more elaborate meaning be expressed in any less carefully guarded form than the longer one just quoted? It does not need the questionable support of tradition.

[1] The formal logician's difficulty in admitting this seems to be largely due to the confusion between assertion and sentence. Formal Logic holds that a proposition may speak either of 'A' or of 'so-called A,' but that if it speaks of the former it does not restrict itself to the latter. To the formal logician accordingly the proposition 'A is A' has a different Subject from that of the proposition 'So-called A is A,' *since the words in the sentence are different;* and in consequence he overlooks the fact that the former sentence, if not interpreted to mean the same as the latter, begs the question whether the information it pretends to give is true. If in saying that all S are P we decline to bind ourselves down to any particular cases of S, we might as well say that *when* S is P it really is so. To be completely consistent the formal logician ought to deny that any concrete example of A may ever be challenged to show its right to the name.

ever made in the application of names,' is the only sense in which the sentence 'A is A' makes an assertion, and then it is plainly false—if any false account of the nature of anything is possible.

I hope it is clear, however, that this criticism applies only to the attempt to regard the axiom 'A is A' as a rule without exceptions,—exceptions both numerous and important. As a half-truth it may have some of the rough value which a proverb or a copy-book maxim has. Still that cannot give it the right to check inquiry into the A-ness of things which are taken as A. Only if all our asserted facts were certainties could the Law of Identity be trusted. But to admit that knowledge is progressive is to admit that existing knowledge is defective, and our asserted facts therefore always open to question. In proportion to the defects of our knowledge, our 'notions' —*i.e.* the meanings which we distinguish by our definitions—are abstract and wordy. Here the value of the distinction between definitions and translations comes again into view; or rather the value of any distinction which helps us to remember that our existing notions are more abstract than the facts, and need constant revision in the light of difficult cases,—cases not yet sufficiently considered. Further progress in knowledge always depends on our power of seeing these difficulties; and to preserve the power we must fight against the soporific influence of sham definitions.

Especially we must guard against ever allowing them to stand in the way of an inquiry into facts. For instance, if Darwin had said to himself that the word 'species,' by its very definition, *means* something different from 'variety,' and that therefore it must be sheer nonsense to talk of the latter becoming

the former, he would have found his inquiry blocked at the outset and could not have taken the steps he actually took towards its solution. Some of his opponents, using a shallow and formal Logic, have even sought to refute his conclusions on this very ground.[1] But he saw—what every one now has a better chance of seeing—that we cannot control the facts of a case by merely naming them. We do not raise and answer the question how far X and Y are the same, either by giving the names a sharply contrasted meaning or by declaring them to be synonymous. By doing either of these things we *beg* the question,—we shirk the real labour of the inquiry and pretend to have solved the problem by the easy method of attaching a special meaning to a couple of words. If our knowledge of Nature is to grow, we must be allowed the kind of verbal contradiction which, as we saw in chap. i., leads to a change in the definition of a word. Anything which — like excessive respect for authority—limits our freedom in doubting whether 'A' is really A is an influence which, whatever may be said for it on the score of discipline or the preservation of established beliefs, is at any rate directly hostile to the progress of knowledge.

The Law of Contradiction is usually written 'A is not not-A,' and in this form it stands or falls with the axiom just discussed. Another form of it, sometimes supposed to guard it against all criticism, is "Con-

[1] A still feebler argument, with a similar defect, was used by Agassiz to prove that species are immutable: "If species do not exist," he asked, "how can they vary?" Of course the existence of *so-called* species has never been in question; the question is as to their nature, and this cannot be solved by mere definition. We may all grant that an immutable species is immutable, but this does not help us to know whether any such species exists.

tradictory assertions cannot both be true at once." But here again two different interpretations are possible, one making it applicable and the other not. In the abstract it is of course undeniable that if an assertion is true its contradictory must be false, and *vice-versâ*; that is an explanation of the meaning of the word 'contradictory.' But what does this tell us about actual assertions? Since the assertion is not the sentence, but the *meaning of the sentence*, to say that we cannot at the same time assent to and deny an *assertion* is no more than to say that our intended meaning (whatever it may be) really is intended. On the other hand, it is not true that of apparently contradictory *sentences* both at once cannot express a true assertion; and this is the only way in which the Law of Contradiction can be made applicable, since examples of assertion take of necessity the form of sentences. Notoriously, it often happens that, owing to some ambiguity in the language, the appropriate answer to a question is 'yes *and* no.' There is often a reasonable doubt whether we have interpreted a given sentence correctly, just as there is often a reasonable doubt whether the general name A is correctly applied in a given particular case.

Thirdly, there is the Law of Excluded Middle—'A is either B or not B.' Precisely the same objection applies. If a given term B happens to be ambiguous these is no trusting the axiom that it must be either affirmed or denied in this downright manner. When the cross-examining counsel demands from the puzzled witness "the plain answer Yes or No," the assumption implied is that ambiguity is impossible —an assumption which is easily made in the interests of falsehood. And, apart from the tricks of the law-

courts, wherever inquiry leads to the readjustment of the meaning of any name—a process which often extends over a good many years during which the old and the new meanings exist side by side—the Law of Excluded Middle, as an applicable statement, cannot be trusted.

These three principles, therefore, when taken as the student inevitably takes them, pretend to justify the practice of begging a question by means of a name. Unless they are made purely abstract and meaningless they all involve the false assumption that ambiguity is impossible. So far as the improvement of our existing knowledge is our object, the two Laws that we should keep ever before us are these: (1) Anything actually named A may better deserve the predicate non-A; and (2) No predicate, B, is so safe against ambiguity that it may not be asserted and denied at once of the same Subject, A; such assertion and denial being alike meaningless until the ambiguity is removed. For these reasons it would be difficult to find any case where a scientific generalisation has been improved except by disregarding the traditional Laws of Thought in their only applicable sense.

§ 36.—The Weak Point in Description

We have now noticed a few leading samples of the kind of common misinterpretation which certain short expressions of the modern doctrine of classes have occasionally suffered from, but as yet very little has here been said about what it does assert or how it conflicts, exactly, with the half-truths of common sense. The latter question is rather a large one, and will be con-

sidered in next chapter, but to the former an answer may now be given provisionally, which can be stated better, if necessary, when any definite misinterpretations of it occur.

Subject, then, to faults which may afterwards be found with the statement, we can now say that the change from the older to the newer view of the constitution of classes has been steadily in the direction of increasing our power of raising useful doubts or questions, of a kind that were formerly in some danger of being thought impossible. We are learning to expect that no class-attribute is to be found quite pure in concrete cases, but that in any actual 'A' some non-A is entangled. No longer therefore does the truism that A is A forbid us to ask whether in a particular case the non-A element in the so-called A has received due recognition. We are now able to admit, not here and there but universally, that description—the application of general names to particular cases—has in it an element of theory, and so of doubtfulness.

Much of the change of view is due to the greater recognition in recent times of the extent to which difference pervades all things. So far from denying the existence of natural differences—as we saw above that some of our opponents mistakenly imagine—we go out of our way to recognise differences even in cases where they are in some danger of being overlooked. We begin by admitting not only that one class differs from another but that no class exists the members of which are all exactly alike; and that is indeed the very reason why class-names are needed. The whole object of any class-name is to group together (for the purpose of making general assertions)

individual members which are not only alike but different; and so to give *unity in spite of difference.* Just because it gives this unity, a general name, as such, must fail to specify.

And so it is that to classify S as P is always to neglect as unimportant some real difference between S and the other members of that class; and to raise the question whether S is P is always to ask whether the difference neglected has not, after all, more importance than the assertor supposes; a question which, as we shall see, remains eternally open except for the person who (for reasons good or bad) has for the time decided to close it. Whenever the assertion is made that S is of such-and-such a *kind*, the meaning is not that there is an entire absence of difference between S and the other members, but that the difference is (for some purpose) less important than the resemblance. As to the mere extent of the difference or resemblance, our senses may deceive us; as to the relative importance of the points of difference or resemblance, that is a matter of theory or opinion,—theory made by fallible men with an incomplete experience of the ways of Nature. It is always an open question, therefore, whether the class-name which we apply to S has not the effect of exaggerating the importance of the likeness that exists. For instance, it is literally true that men are *animals*, but to stop at that fact,—to dwell on man's merely animal nature as opposed to his difference from other animals—would be misleading. Sometimes, again, we hardly know whether a generic description or some narrower one comes nearer to the truth. The man who likes his 'kind' is not necessarily the man who likes a bank-holiday crowd at Margate or a crush in a

London drawing-room. Always the right of S to a place in the class P rests in the end on a close examination of the extent and kind of the resemblances and differences between S and the more clearly recognised members of the class, coupled with an inquiry into the reasons for constituting the class in one way rather than another. To judge that S is P is always to judge that S, in spite of any difference from the other members of the class P, yet resembles them *essentially*,—*i.e.* possesses qualities which are of the essence of the class. But the modern[1] meaning of 'essence' differs from the ancient one in being applied to something much more flexible. The essence of a class, it is now recognised, is not created by Nature once for all, but is adjusted and readjusted by man to suit the purposes—often quite temporary—for which he wants to group facts in order to speak of them. And from this it follows that whenever S is classed as P the question may be relevant what sort of a class P is here contemplated,—what is its definition.

§ 37.—Metaphorical and Matter-of-Fact Description

Another concise account that might be given of the difference between the older and the newer view of class-names is that the latter tends to break down

[1] Professor James (*Principles of Psychology*, ii. 335), speaking of the common slavery to words, says, "Locke undermined the fallacy. But none of his successors, so far as I know, have radically escaped it, or seen that the only meaning of essence is teleological, and that classification and conception are purely teleological weapons of the mind." I cannot help thinking that this newer view of essence is taking pretty firm hold of us, and as rapidly as could be expected. Is it possible for any one to do good original work in natural science without a grasp of the doctrine that names are artificial? See also my book on *Distinction*, p. 139 and elsewhere.

the loose convenient distinction between metaphorical and matter-of-fact description. We have noticed already (p. 142) that what may be called predication by analogy, or by metaphor—*e.g.* 'S is a *Judas*'—only differs unimportantly from predication by means of a recognised class-name. But we may get a clearer view of this truth, and of the close kinship between metaphorical and matter-of-fact description, through seeing how the former sometimes becomes the latter by imperceptible degrees. Words which are obviously fanciful when first applied to a given use become in process of time accepted class-names, and thus instruments of the most matter-of-fact description. This is illustrated not only by the occasional cases where a proper name (like *Mercury* or *Mæander*) has become general, but by every gradual extension of meaning in an accepted general name. In all such cases the new application seems at first a little strained; but gradually this appearance wears away, and an increasing number of people accept the new usage as plain description. Thus we speak now-a-days of an *investment* of money in quite a prosaic matter-of-fact way; the metaphor by which the word came to its present use has entirely faded out of notice; we do not habitually remember its connection with *vestment*. And the same with *developing* a photograph, or with a word's *derivation*.

There is a difference, of course, between a metaphorical or fanciful name and a matter-of-fact one. But the difference is not so sharp and clear as the popular view assumes. Description by metaphor does not imply the absence of reference to a class, but only the absence of a clearly specified class referred to. In every analogy or metaphor there is *apparently*

important likeness combined with apparently unimportant difference, and that is all that there is in any class, however definite it claims to be, and however completely it is recognised in a language. Again, either kind of description may be inaccurate, in the same way and from the same causes. The mistake into which we might fall when undue stress is laid on the distinction, is that there are two kinds of description, one 'matter-of-fact' and the other analogical, metaphorical, or fanciful; and that of the two the former is clearly the more accurate. The better view, when we do not allow the distinction to mislead us, is that all descriptions are more or less fanciful (or theoretical), and that whatever advantage may be gained by avoiding the more fanciful end of the scale is counterbalanced by the false supposition that in matter-of-fact description we are perfectly safe. The more matter-of-fact a description appears to be, the greater *pretence* of accuracy it makes; that is precisely its danger. There is a well-recognised risk of caricature in comparing S to marked characters in history or fiction, but the risk of caricature which lurks in all predication is much less well known, and the error is therefore less easily detected. And so, where a descriptive name is misleading at all, it is even more misleading if it happens to be a recognised class-name than where it makes less pretence of simplicity, plain statement of fact, or widespread acceptance. The class-name 'gentleman' may, for instance, be more misleading in a given case than some metaphorical name like 'a Coriolanus' or 'a Chesterfield.' A class-name cannot in itself guarantee its own correctness of application; it can add nothing to the resemblance, nor diminish the difference, between the

cases covered by it. At most it provides some evidence that the world has hitherto imagined the class-resemblance important for a number of ordinary purposes.

A further remark may also here be in place. Suppose, by a stretch of imagination, that our insight into Nature, past, present, and future, were somehow miraculously extended and deepened, so as to guard us, in the case of any descriptive term, against inaccuracy in its application, what would be the result? That term would at once become entirely devoid of descriptive force. It would become the name of a purely individual case,—like a proper name when used for mere reference. It would not compare the Subject with a class of cases (even a class vaguely conceived) and declare that the resemblance is more important than the difference; for, being perfectly definite, it would not allow us to neglect any existing difference whatever, and between any two cases some difference exists.

Whether this result seems paradoxical or not, it obtains some partial confirmation from the fact that men so often prefer loose and vague descriptions, and even openly metaphorical ones, when effectiveness of description is specially desired. Fanciful names are a resource well known to be useful where we wish to characterise pithily some complex matter which would otherwise need a long roundabout description. The virtue, for instance, of a prominent person may be asserted to be 'Pecksniffian,' or a whole political party picturesquely described as 'rats.' This method of characterising has easily-seen advantages where strength of assertion is desired, and it obviously saves trouble. No one, I believe, disputes the power of

these devices of language, and at any rate in the more chastened forms in which they occur in poetry we feel that to pare away their inexactness would not be an unmixed gain. Description that comes near caricature may even be useful in setting our wits to work upon the task of exact appreciation of the likeness. If the possibility of error were banished from the world, and with it all the indefiniteness of language, there would be literally nothing left for Logic to do. But this contingency is at present remote enough; the names we use are far from being always 'proper.'

§ 38.—Some Consequences

One practical use and application of the newer view of classes is as against the dogmatic assertor's attempt to override inquiry into the truth of a stated fact. If there were any predicate terms whose application could never be doubtful, that would mean that there are predicative assertions the truth of which lies wholly beyond dispute. But no such class can be recognised—except as a mere abstract possibility—by science or philosophy. We may all admit of course that there are many predications made which it would be the reverse of practical to doubt, and which no one but a quibbler would hesitate to accept as true. But to accept a 'truth' is one thing and to cut ourselves off from the right of questioning it at any future time is quite another. Often an assertion is so unimportant, or so easily understood and so little misleading in spite of its faults of expression, that there could only be a waste of time in raising doubts; but a doubt once actually

seen demands attention, however unlikely it may have seemed beforehand. To call our own assertions indisputable is of course always tempting; nothing is commoner than the wish to take up this attitude towards our critics. But Logic does not exist for the sake of suppressing criticism in the interests of the random assertor, and though the logician may (with the rest of the world) loosely talk of some assertions as 'indisputable,' he cannot (as the rest of the world contentedly can) apply this epithet to assertions which are actually disputed.

While, therefore, it would be foolish to suppose that we can never class a thing as A without consciously and deliberately raising the question whether it does not rather deserve to be classed as non-A, it must nevertheless be admitted that any name, pretending to be descriptive, fails to be so if it declines to face the possibility of being wrongly applied in particular cases. In every predication 'S is A' we claim to have exercised a choice between the predicates A and non-A, and to have chosen the former on sufficient grounds. However rapidly and instinctively the choice may have been made, the descriptiveness of either of the opposite predicates depends on the contrast between them, and the preference of the one to the other when either is applied. So that a class is not only a grouping of individual cases without regard to the question what cases are to be excluded, and why; a class is always a *sect*, — a portion cut out of a larger whole and placed in imaginary isolation. And this involves two further consequences: (1) that a predicate term is meaningless if it be supposed to belong impartially to everything in the Universe; and (2) that in the cases where a name,

supposed to be descriptive, is difficult to define precisely, its descriptive meaning rests on insecure foundations, and may vanish entirely on occasion. How this total disappearance of meaning takes place we shall inquire in the next chapter.

And apart from its direct application against wordy dogmatism, the modern view of classes has a special bearing on the question whether there can be such a thing as a fact which is 'single,' or simple, in anything but name. The defect, we have seen, to which class-names are liable, and which therefore may affect any statement of fact, consists in the obliteration of details of difference which may or may not be important. That they are unimportant in a given case is always a matter of theory, and therefore open to question if it should seem worth while. But this is to recognise, in other language, that in every statement of fact there are more and less deniable portions, or that the fact as a whole may be split up into fragments, differing in certainty, and that however far we may be led in doing this there is in strictness no end to the process except where we choose to make one. The more apparently indisputable it is that S is P, the more any actual dispute about that assertion must turn on the precise importance of the likeness and unlikeness of S to the recognised members of the class P. Thus it is specially when assertions are nearly true and yet are disputed that we are drawn into questions of careful definition. Downright errors, like the assertion that the Earth is flat, lie open to condemnation by shorter and easier methods.

CHAPTER VII

INDEFINITENESS AND AMBIGUITY

§ 39.—Complete Description and Perfect Definiteness

From the admission that in every class every member differs to some extent from every other, a number of other admissions follow which interfere considerably with our acceptance of certain widely-received half-truths about the use of words, and which thereby throw some much-needed light upon the nature of ambiguity, that most effective of all the avoidable sources of bad reasoning. The chief root of these popular half-truths may be found in the confusion of ambiguity with indefiniteness, and the chief result of them in the tendency to overlook the harm caused by ambiguity and to minimise the importance of detecting and removing it. In this respect the main difference between the least scientific common sense and the most scientific Logic lies in the former's readiness to identify the search for definitions with unpractical subtlety or mere quibbling. Through its confusion of indefiniteness with ambiguity it loses the power of discriminating between the justified and the unjustified inquiry for definitions.

In the first place, then, if the class-name P, just

because it is a class-name, neglects the individual differences between one member of the class and another, the same must be true of the more restricted class-name AP, and of any class-name A . . . ZP., however restricted. In describing anything (S) as P, the description is evidently incomplete in so far as it omits to say what *sort* of P is intended; and it always must omit this to some extent. For instance the description of Socrates as a 'man' evidently leaves room for further characterisation if required; but however far the characterisation proceeds we can never make it finally perfect, since it is throughout performed by class-names to which the same defect attaches. However many things may be said about Socrates, or about any fact observed, there remains still more that might be said if the need arose; the need is the determining factor. Hence the distinction between complete and incomplete description, though perfectly sharp and clear in the abstract, can only have a meaning—can only be applied to actual cases—if it be taken as equivalent to *sufficient* and *insufficient* description, the sufficiency being relative to some purpose. Evidently the description of Socrates as a man, scanty though it is, may be fully sufficient for the purpose of the modest inquiry whether he is mortal or not; and, generally speaking, in all description there comes a point at which even the most inquiring mind is willing to cease, for the time, from collecting further details, and sets itself to consider how to use for inference those already collected.

Secondly, from the admission that all description is necessarily incomplete, it follows that every name, however fully descriptive, is necessarily indefinite; or

that the perfect and final definition of any word or set of words is impossible. Passing over, for the moment, our natural disinclination to admit this,—the sources of which will presently be discussed,—it is evident that if it be true, then the distinction between perfect and imperfect definition has the same defect as that between complete and incomplete description. The sharpness of the merely abstract distinction does not alter the fact that if we are to use the distinction at all we must translate 'perfect and imperfect' into 'sufficient and insufficient,' again with reference to some purpose understood. If perfect definition is impossible, it is evident that to ask intelligently for a definition is not to ask for a perfect one, and that the intelligent complaint that a given definition is imperfect can only mean that for some assignable purpose it does not suffice.

Now the tendency of popular thought—encouraged, as we shall see, by the traditional Logic—is to regard this insistence on the difference between sufficiently perfect and absolutely perfect definition as a piece of misplaced ingenuity or unpractical trifling. No doubt it would be possible to use the distinction in some such spirit, to make perhaps some show of drawing from it consequences destructive to all thinking, or at least widely and rashly destructive to the present results of human thought and experience. Since no one can say exactly how much earth added to a molehill would convert it into a mountain, the quibbler may seek to blur the difference altogether. But why assume that this is the only kind of use that can be made of the admission? What will here be deduced from it is an answer to the problem what the value of any search for a definition depends upon, and to the

further problem what are the conditions of effective and useful casuistry.

The popular disinclination to admit that all definition is necessarily imperfect does not, I think, generally take the shape of denying the statement itself, but rather of denying its value and of reckoning wholly without it—just as we all reckon without the bare possibility that an earthquake will destroy London to-morrow. Still our first step should be to get the fact itself admitted, irrespective of the question as to its importance. Some readers may fail to see any connection between the necessary incompleteness of all descripition and the necessary indefiniteness of all descriptive names.

What is meant is that since the definition of any name P is an attempt to describe the difference between those things which are P and those which are not P; and since that difference, like everything else, can only be described in general terms and therefore incompletely; no definition can *perfectly* define. Sufficiently for the purpose of a given inquiry, of course, the feat is performed every day; but it cannot be done so as to suit the purposes of every possible inquiry, future ones included. Or, to put it in another way, definition is the attempt to decide what amount and kind of difference is allowable between members of the class P, or what departure from the normal type is required to destroy a doubtful member's right to the name; and if the answer is that it does not matter whether the members are A or not, but they must (or must not) have the quality B, then—since B is also a general name—the same question arises in regard to membership in the class B; and since at every step general names are used there is no end to

the inquiry except where we choose to make one. To-day's needs may be satisfied, but to-morrow's needs cannot be securely foretold and provided for.

§ 40.—The Popular View of Indefiniteness and Ambiguity

Let us assume, now, that as a matter of strict theory this is admitted. The question remains what use is to be made of the admission, and whether it amounts to anything more than one of those theoretical truths which are so remote from practice that the wise man is he who persistently forgets them. And to answer this we must look more closely at the common-sense way of dealing with the question, and especially at the assumptions which underlie its methods. The chief of these is, I think, the assumption that indefiniteness and ambiguity are the same thing, but there are also others so closely involved in this that in dealing with it we can scarcely avoid meeting them.

And first as to the facts of the popular usage. Though loosely-held views will not bear stating as if they were consistent and precise, I think we may fairly say that to a large number of people it does not occur that indefiniteness and ambiguity are in any important sense different things. One natural reason for the confusion is that as a rule we do not notice the indefiniteness of a word until it has caused an ambiguity, and hence we tend to speak as if the two defects were identical. Since neither is commonly 'found' without the other it does not seem to matter much which name we use for it in a given case. In much the same way crime, or heroism,

tends to be identified in popular thought with only the gross or striking forms of it. Wherever a quality is on some occasions difficult to detect there will be a tendency on the part of the many to identify that quality with its more obvious manifestations only. To a hasty or careless or ignorant view, the good and the bad are the obviously good and the obviously bad; and to the same sort of view indefiniteness exists only when it has actually caused trouble. The most widely-received opinion appears to be something of this kind: that the indefiniteness (or ambiguity) which inheres in a word is either so slight as to be of no account, or else so great as to deserve the attention of sensible men; that theoretical Logic may, if it likes, amuse itself with the search for an accurate definition in either case, but that only where the indefiniteness is great can there be any practical value in the search. It is generally supposed that the latter case is comparatively rare, but that nevertheless there are in use a certain number of 'highly ambiguous words.' The point of view is similar to that which is commonly taken about unwholesome food. The unwholesomeness of any food, it is said, is either so slight as to be of no account, or else so great as to justify its avoidance by sensible men. Fanciful people may if they like condemn this or that ordinary dish, but it is only when food is 'really unwholesome' that there is any good reason for avoiding it. This roughly practical way of regarding the food question is here quoted so as to put the case for common sense fairly. Whether the analogy is complete or not there can be no harm in assuming, at first, that the common logical view about ambiguity is as sensible and healthy as the non-valetudinarian view about food. The question

whether it is so is the point we have now to discuss. Is the degree of indefiniteness the factor that determines its importance?

§ 41.—Degrees of Indefiniteness

It is clear that so long as ambiguity is identified with indefiniteness we cannot avoid the conclusion that it is only the degree of the fault that matters. Since we all instinctively assume that the same effect follows the same cause, the more we are inclined to identify ambiguity with indefiniteness the less do we naturally expect any difference between their results. There can be no question, then, from this point of view, of one being more destructive to meaning than the other, but the practical distinction (it seems) must be between the larger and effective kinds of the defect and the finer or scarcely visible ones which no one but a mere precisian need care to notice.

And this would perhaps do very well if the notion of degrees of indefiniteness could be given a clear and satisfactory meaning. But the notions of more and less as applied to indefiniteness are difficult to explain, or at least to connect with the need for definition, unless they are made dependent on the effect produced, and then of course it is merely arguing in a circle to make the effects depend in turn on the amounts. Since all descriptive words, as such, are indefinite, what can be meant by calling one more indefinite than another?

Evidently it will not do to make the distinction turn on the grossness and obviousness of a word's double meaning, for then we should have to admit that the very largest 'ambiguities' are those that,

while they may lend themselves easily to the construction of puns, are certainly not effective sources of error.

A show of answering the question may perhaps be made by saying that words are more and less definite in proportion as they have been carefully or carelessly defined, whether the lack of definition be due to mere inattention or to the kind of difficulty which attaches, as every one knows, to words like 'Life' or 'Truth.' Names which either baffle definition or which do not seem to call for it would then be contrasted with names which both call for it and get it,—names, for instance, like "£5 Bank of England Note," where the required class-marks are numerous and yet may be known with great minuteness.

But then in the first place the class of 'more indefinite' names would include those whose indefiniteness is notorious and striking, and which as we have just noticed are on that account comparatively harmless. And in the second place it would also include those which all the world *rightly or wrongly* is content to use with vagueness and freedom. Of course those which are wrongly so used are thereby shown to be troublesome words, but how is the same to be said of the equally indefinite words which are rightly used without extreme precision? This would be to fall into the very defect—unpractical pedantry—which common sense is so anxious to avoid. In two ways therefore we fail to get any simple identification of the 'more indefinite' words with the words which actually cause most trouble. And on the other hand it is by no means certain that even the most careful attempts at definition will

have anything like the effect which this view of the distinction supposes. The leading technical terms of Logic itself are an instance of words which have undergone plenty of careful definition, and what do we find as the result?[1] Indeed, on general grounds we may see two good reasons why it cannot be true that the most satisfactory words are those that have the most elaborate definitions. For one thing, it is often the proved unsatisfactoriness of the word which has led to the elaboration; and for another the very fact that so much care has been taken is apt to engender a false security. Thus technical terms run a special risk of becoming idols. The modest beginner in Logic finds it hard to believe that a name like 'hypothetical proposition,'[2] for example, can be used by a logician, speaking carefully, in such a way that neither the user nor any one else can say which of two different things he has in view.

These hopeless attempts to make a distinction between greater and less vagueness which shall correspond to that between less and more negligible vagueness, and yet not depend upon it, are encouraged instead of discouraged by the traditional Logic, and chiefly by means of its abstract distinction between 'univocal' (straightforward) and 'equivocal' (indefinite or ambiguous) terms. Naturally, if the only distinction that can be made between more and less definite words is unsatisfactory we can hardly improve matters by adding a fictitious sharpness and rigidity to its other defects. Such a distinction would no doubt be of the utmost value if we could really draw it otherwise than in the

[1] This question is discussed in Part III.
[2] See § 60.

abstract; but to admit this is by no means to admit that it can be so drawn, or even that it is worth while to get as near to it as possible. That it cannot be more than abstract follows from our admission that all actual names are indefinite; and the argument against neglecting this, as a finicking kind of truth, and doing our best to make the distinction as little misleading as possible, is what we are now engaged upon. The conclusion we are to reach is that the only way to destroy its misleading power is to cease from attempting to use it,—to recognise its defects instead of glossing them over, and to substitute for the conception of faulty and faultless *words* that of ambiguous and unambiguous *assertions*.

§ 42.—The Indecision of Common Sense

That some reform in this matter is needed may be seen not only from the above direct criticism on the notion of greater and less definiteness, but from the contradictions and perplexities which are traceable to that notion. Although in the main its effect is to discredit careful inquiries into a definition, yet it also weakens our power of dealing effectively with those inquiries when they are really quibbles. On the general question what effect 'indefiniteness or ambiguity' has upon meaning, common sense can only give a hopelessly undecided answer; it wavers between the view that a 'slightly ambiguous' meaning is better that none at all, and the opposite view that if you pretend to use a word with a meaning you must be prepared to explain exactly what you mean. And instead of clearly recognising the self-

contradiction of these views when taken as general, and setting to work to distinguish the one kind of occasion from the other, common sense is content to leave the two views side by side, and in practice to appeal to whichever happens to be convenient. If you want to defend an ambiguous assertion, you find it useful to remember that a little indefiniteness is not a serious matter; if you want to attack one, then you call to mind the opposite principle. And the traditional Logic makes no attempt to solve this difficulty or to deal with this contradiction. Hence the confusion is not confined to the casual opinions of the average man, but a good deal of it may be found also among philosophers, if their views on this particular point were given by early instruction, and have happened not to advance with the rest of their knowledge. The textbooks dwell only on the kind of doubleness of meaning which is most obvious. For instance, if the word *sovereign* were chosen to illustrate ambiguity, the student would be led to think that its defect consisted in its indifferent applicability to *kings* and *coins*.[1] The consequence is an ingrained idea that ambiguity is a defect that only the most careless assertions can suffer from. Naturally (and often rightly) a disciple will not believe that his master's doctrines are careless; hence the deepest kind of criticism of these doctrines appears to him the shallowest, and he will scarcely listen to it. Try the experiment with the disciples of any writer whose thought here and there rises into obscurity, and see what proportion of them will stand the trial.[2]

[1] See the examples given by Jevons in his *Elementary Lessons*, iv. See also § 45 below.

[2] Mr. Knox (*Mind*, Jan. 1900) seems to wish the experiment tried with the disciples of T. H. Green. There could hardly be a better example.

Finally, in addition to the other reasons against confusing ambiguity with mere indefiniteness we should notice the tendency of this confusion to hide from us the fact that all descriptive words are of necessity indefinite. What common sense really rebels against admitting is that descriptive words are always *ambiguous*. Everyone sees at once that words are not in fact ambiguous when they are understood, and that this fortunate fate sometimes attends them. Hence no one who means by 'indefinite' the same as he means by 'ambiguous' can admit the indefiniteness of all class-names. In the same way the comfortable assumption that sin essentially consists in being found out may hinder our conviction that all men are sinners.

§ 43.—Indefiniteness as Distinct from Ambiguity

The remedy for this state of things seems to be, as we said just now, to substitute for the notion of univocal and equivocal (or more and less definite) words that of ambiguous and unambiguous assertions; to substitute, that is, for the popular view that some words are so indefinite as to cause important confusion, while others are so definite as to escape this liability, the clear recognition that all words are alike indefinite but are not alike ambiguous—the latter defect being due not to the words in themselves but to the occasions of their use. In this conception are involved the following views: that indefiniteness is not itself ambiguity, but is only a predisposing condition of it; that ambiguity arises only when indefiniteness is detected in a special context,—so that the

opposition resembles that between fallibility and detected error; that effective doubtfulness of application is not a quality attaching to names apart from their context, but only belongs to them as actually used in assertions; and that every word, in spite of its fundamental indefiniteness, and in spite of any variations of definiteness which (in any sense whatever) we may choose to recognise between different words, is free from useful doubt in some of its applications, and open to useful doubt in others.

It may be suggested that the question as to a difference between indefiniteness and ambiguity is a mere question of words. We should admit, of course, that the choice of words to mark an opposition is always a matter of pure convenience, and is therefore less important than the recognition of the distinction by means of some words or other. It is quite possible that by means of some such expressions as actual and potential ambiguity, or effective and ineffective indefiniteness, the main object would be secured. On the whole, however, it seems more convenient to say that indefiniteness when detected in a special context becomes ambiguity (with disastrous effects on meaning), and that till it is so detected it remains 'mere indefiniteness' and leaves the meaning intact. One reason for adopting this mode of expression is that the common confusion is no doubt partly due to insufficient attempts to define the term 'ambiguity.' The most superficial account that could be given would be that ambiguity is 'double meaning,' or that "a word is ambiguous when it has more than one meaning, as for instance the word *pound*, which means indifferently a certain coin, a certain weight, and a pen for strayed cattle." Whatever may be the

merits of this account as a mere translation there could scarcely be a surer way of obscuring the problem as to the effects of ambiguity than by taking as typical those cases which are least effective because the double meaning is most obvious and well known. Another reason for making the distinction between indefiniteness and ambiguity, instead of between two kinds of either, is that the well-intentioned old rule against allowing the middle term of a syllogism to be ambiguous evidently does not recognise any harmless kind of ambiguity, while the equally well-intentioned rule that a definition must not be expressed in indefinite language evidently allows no room for a harmless kind of indefiniteness. The former rule tells us that an ambiguous middle always invalidates the conclusion, and not only when the middle term suffers from one particular kind of the defect; and the latter rule sets up, as we have seen, a wholly impossible standard, on any interpretation except that 'indefinite' means 'insufficiently definite,' and thus refers to the special purpose for which the definition is wanted.

§ 44.—Ambiguity as Attaching to Assertions

Assuming, then, that we consistently substitute for the notion of perfect and imperfect that of sufficient and insufficient definiteness, and also reserve the term ambiguity for the latter of these two conditions of a word, it is easy to see that ambiguity is a defect attaching not to words in isolation from their context, or in a sort of average context, but to words as used in asserting, and so to the assertion instead of to the word. The convenience for the sake of which we may sometimes speak of 'ambiguous words' is only that

kind of convenience which justifies any loose elliptical expression when a longer one would be safer. The common-sense view depends upon an assumption that words are things which exist independently of their particular context. So they do,—in a dictionary, or in a list of examples. But we are now speaking of the conditions of the *use* of language; we are trying to get a view of words and assertions not as they look when they are cut and dried and exhibited in a museum, but as they grow and flourish or wither, succeed or fail, when they are used to express a meaning. In asking whether a meaning holds or fails we do not necessarily care to know whether most people on most occasions think they understand the words or not; the decisive question is whether on the given occasion the words perform their function properly. That is why we here dwell on the distinction between a fault which, like ambiguity, attaches to the assertion, and a fault which, like mere indefiniteness, attaches to the separate words. The faults of an isolated word are often irrelevant in a given context; there are many cases where no further explanation of a word is called for. But if a word actually produces an ambiguity some further explanations are then imperatively required, for without them the statement has ceased to be an assertion at all.

Here the analogy of the unwholesome food may be referred to again. For ordinary purposes we habitually assume that unwholesomeness is a quality which exists simply in the food, not in the food and its consumer taken together. But in strictness we know that the fact is otherwise,—that the individual consumer is part of the 'context' of any given food, and that its actual wholesomeness depends upon

its context. We must not press the analogy too far, but we may notice that a logician who declines to take the context of words into account, and so declines to recognise that the same word may be sufficiently definite in one context and not in another, is in the position of a doctor who should hold that the digestibility of a given kind of food is something quite independent of the person who tries to digest it. Such a doctor, we must admit, would take an easy-going view of the science of medicine.

When it is once recognised that every descriptive name is of doubtful application in some cases though sufficiently safe in others, we have taken a long step towards solving the problem how to distinguish between the legitimate or useful and the quibbling or pedantic inquiry for a clear definition; for then we base the value or need of the inquiry not on the sort of word, considered broadly, nor on its general utility, but on its actual defect,—on the hindrance it presents to the desire to understand sufficiently some assertion in which the word is used. We have then done something at least to break with the idea that words of some particular kind,—for instance the words that 'everybody knows the meaning of' (like *horse*), or again those that admit of a strict definition (like *gold*), or again those that are carefully defined for special purposes (like *alien*, *city*, or *£5 note*)—are thereby safe against all practical doubts about their correct application in particular cases; and have substituted for this highly misleading notion that of requiring to know what a speaker means by a given assertion before we rush into its admission or denial.

§ 45.—Proportion of Doubtful Applications Irrelevant

In the same way we get rid of the notion that mere number—or proportion between the safe and the doubtful applications of a given word—has anything to do with the question whether a particular inquiry is justified, except to prejudice it. This is, in fact, almost a corollary from the admission[1] that obvious sources of error are comparatively ineffective; so that if we were content to sort out the names which are most often wrongly or doubtfully applied, and to regard them as the chief source of ambiguity, we should only have found the source of those confusions which because they are most noticeable have least practical importance. The more exceptional any source of confusion is, the more difficult it is to guard against or remove; and therefore the names whose defects it is most important that we should recognise are precisely those in which the defects are so seldom visible that we carelessly take them as 'for practical purposes' non-existent. Practical purposes cannot, except in the roughest way, be lumped together as an indivisible whole.

But perhaps an instance will best show what is meant. Take the name *sovereign* (applied to a coin)—a fairly extreme case of a name which everybody knows the meaning of, and which also admits of close definition, both chemically and by more external marks. We may assume, I think, that the number of real sovereigns in circulation is largely

[1] Page 180.

in excess of the false ones; for which reason we commonly accept sovereigns and pass them on without any very careful reference to the marks required by the definition. Yet when a doubt has actually arisen in a particular case, how do we deal with it? Do we then refer to the mere relative number of good and bad sovereigns as having anything to do with the matter? Because so many millions of sovereigns are genuine do we therefore accept a single one which seems suspiciously light? Even the purely business man, the man least tainted by logical theory, would hardly consider that practical.

It is true that in the case of doubtfully genuine coins the man of business does not himself go deeply into the definition. But that is because a rougher test—such as ringing the coin on a counter—is generally allowed to settle the matter, while if necessary a more careful expert opinion can be taken. Our point is, not that the practical man himself gives much elaborate thought to the question, but that instead of settling it on statistical grounds he takes the doubtful case on its own merits. He does not think it unimportant merely because it is exceptional. He does not seek excuses for avoiding the inquiry altogether, but settles it as well as circumstances permit. That is all that we need here recognise.

Now let us see what the notion of taking a case on its own merits involves in regard to ambiguity generally. Ambiguity, as we have defined it, arises where, owing to some hitherto unnoticed indefiniteness in a word, an assertion in which that word occurs comes under suspicion of being subtly false.

The purpose, then, for which the definition has to be sufficient is that a particular assertion shall have a particular doubt as to its meaning removed. And to take this question on its own merits, is merely to recognise that however many *other* assertions, something like the doubtful one, escape the need for further explanation, they no more affect its doubtfulness than the millions of genuine sovereigns affect the doubt in the single suspicious case. For example we may raise no difficulty about understanding the assertions that Brown, and Jones, and Robinson are 'honest,' but when we come to the case of Smith we discover a difficulty in placing him clearly on either side of the line. That difficulty is nothing else than the difficulty of knowing the meaning given to the word in this particular assertion. We might, for instance, agree to mean by Smith's 'honesty' that no shady transactions could be legally proved against him, or that he is 'honest according to his lights,' or again that he is about as honest as the majority of his neighbours or the average of his trade or profession. But some agreement there must be, some choice must be made among possible meanings as soon as we see that different meanings are possible, and affect the answer. Tacit agreements of this kind may carry us far in common intercourse, but they are often extremely incomplete; notoriously, they exist sometimes in the mind of the speaker and not in the mind of his audience, and even a slight difference of understanding about them may be enough to justify the inquiry after a definition.

Those, then, are the sole conditions of ambiguity, and at the same time of the justified demand for

further definition; there must be an assertion proposed for acceptance—a question raised—such that if it be taken to mean one thing we answer Yes, while if it be taken to mean another we either answer No, or at least find difficulties in the way of acceptance. The justification of the demand to know which meaning is intended lies partly in our desire to answer intelligently and truthfully, and partly also in the assumption — often, no doubt, ironical — that the assertor himself has made up his mind which of the two meanings he intends, and has courage to let the decision be known. I speak here of assertor and audience, as if they were necessarily two different people, but that is only a convenient mode of expression, corresponding to the case where the conflict is most visible. In strictness, however, there is no doubt that the same process of forcing further definition,—and even of attempting to shirk the labour of it, or the vaguely apprehended consequences—goes on within the individual mind. In fact, as we shall see, the growth of knowledge is everywhere conditioned by the view of the need for further definition; it is always newly-seen cases of difficulty which help us to correct our older, slacker generalisations; everywhere it is the unexpected exceptions which test and improve our hitherto accepted rules, and so increase our store of general knowledge.

§ 46.—Subtlety of the Inquiry Irrelevant

It should be evident now that the subtlety of the inquiry has, in itself, nothing to do with the distinction between the inquiries which are practically

important and those which are not so. The need for decision between two meanings in order that an intelligent choice may be made between the answer yes and no is something which is totally independent of the place on the scale of careful assertion at which the need happens to arise. It arises, no doubt, oftener in the case of careless assertions than of careful ones; but that, we have seen, is an irrelevant circumstance. That it may arise in the case of the most careful assertion follows from the admission that all class-names are indefinite. The definiteness of a name, as we found, can never mean more than sufficient definiteness; and the fact—if it ever occurs—that a name has sufficed even in all previous cases to express assertions which are free from ambiguity does not prevent its failing on the next occasion. The most we can ever declare with safety in such a matter is that our own imagination of possible difficulties in applying the word is at a loss; not only can we never be sure that future generations will have an equally limited imagination, but it may even be the case that some existing people have a keener foresight of difficulties than ourselves, or are more inclined to take the requisite trouble to imagine them. Thus we cannot, except quite roughly, predict, in the case of any class-name, the likelihood of its escaping the normal fate of class-names any longer; the utmost value of such a prediction is only that of wisdom before the event,—like our opinion that the British Empire will last another fifty years, or that the train I am in will reach its destination safely. Will any one claim that we can set a mere prediction, however well founded, against the subsequent event which contradicts it?

Of course, so far as the event itself is of a kind which is doubtful, this clash between previous theory and observed fact often leads quite rightly to a reconsideration of the 'fact,' and so to a discovery that the theory is not yet upset; as, for example, in the case of the theory that acquired characters are not transmitted by descent. But how can such a conflict ever occur in the case of a seen ambiguity? Can a man see an ambiguity and at the same time not see it? Wonderful acrobatic feats of the mind are, no doubt, to be met with, but would not that surpass all that can be intelligently imagined?

§ 47.—The Work involved in Finding an Ambiguity

Its impossibility will perhaps be even clearer if we look at what is involved in finding an ambiguity. As soon as we recognise that perfect definiteness is a chimera, we have broken of course with the idea that there is any virtue in asking at random for more and more definition, insatiably. We have then already begun to see that the mere demand for a difficult definition, or the mere complaint that a word is vague, is anything but a formidable controversial weapon. It amounts to no more than accusing an assertor of being *fallible*. We have then already begun to see how false it is—except in a sense that does not matter—that a child can raise more doubts in half-an-hour than a sage can answer in a year; we have then already understood that though foolish doubts can always be verbally raised they admit of being very easily disposed of, and that the raising of valuable doubts—*i.e.* the

discovery of an ambiguity—is anything but an easy process. But its difficulty becomes more evident still when we consider more precisely what the process involves. The recognition of two different meanings of a class-name used as predicate implies the recognition of two sub-classes contrasted with each other; and if we have seen that one of the meanings leads us to answer yes, while the other makes us hesitate or answer no, that implies that we think we know something about the difference,—that we have not merely noted it as the ground of a possible subdivision but have seen something at least of what turns upon it.

As an everyday example, of a simple kind, take the name *Liberal* as applied in English politics. Towards the end of 1885, when rumours began to be heard that the Liberal leader had been converted to Home Rule, it was not at first clearly foreseen how important a division would shortly have to be made within the ranks of the party as then constituted. It was assumed, of course, that the name covered a certain amount of individual difference of opinion, but the special ambiguity which soon after arose was then still in the womb of the future. The indefiniteness which was latent in the name up to the beginning of April 1886 became a few months afterwards so patent as to cause ambiguity; within what used to be called the Liberal party there had come to light two sub-classes each of which denied to the other the right to the name.

What happened in this case so markedly is happening every day, more quietly, more gradually, in the wake of all discoveries of fact. A discovery of fact is never quite without importance, and what-

ever importance it has is class importance; it affects not only an individual case but a class of cases. Its influence upon language is always in the direction of rendering clumsy—rendering *plainly* indefinite—a name whose indefiniteness had till then given no obvious trouble.

Since, then, the discovery of an ambiguity implies the discovery of an apparently important subdivision to be made within a class,—implies therefore that we have gone forward from a simpler to a more complex view of the meaning of the class-name,—the possibility that we can also have stood still and not done this is one that we are powerless to consider. Of course the apparently important subdivision may turn out to be unimportant, but that recognition involves the removal of the ambiguity as a prior condition. If and while an ambiguity stands in the way, then, however mistaken may be the views which create it, the only path lies forward through its removal and not back to the unsuspecting innocence we enjoyed in the earlier stages. There can be no doubt of the feeling of doubt itself, especially when it is a reasoned doubt; when it has once arisen, that occurrence has already falsified the prediction that it would never arise.

§ 48.—Summary of the Chapter

In this chapter we have been discussing certain points which bear directly upon the difference between the justified and the unjustified inquiry for a definition, and our plan has been to examine some views about it which are prevalent in popular thought. The fact that they are also encouraged

by Formal Logic gives them a wider range of harmful influence than they might otherwise have, and makes it more worth while for us to examine their defects. The outcome of such views is a vacillating answer to the question when a closer definition is required in order to make a meaning, an answer which leaves the question undecided, and which therefore on the whole favours the easier course of regarding inquiries into a definition as justified rather by their avoidance of subtlety than by the nature of the occasion that raises them. It is always easier to take a general rule as independent of special occasions than to enter into the inquiry what the importance of its exceptions depends upon.

The general rule, then, which common sense is inclined to believe sufficient is that inquiries into a definition ought to be stopped at the point where they become too subtle. Assuming that this is not merely an empty phrase meaning that they ought to be stopped just at the point where they ought to be stopped, it implies the assumption that certain *degrees of indefiniteness* are harmful, but that in all other cases it is better to make light of the defect and not to press for definition. A difficulty might be found in settling the exact line between the two kinds, but there is no need for us to dwell on this objection since another one claims our attention first. The whole conception of degrees of indefiniteness is faulty from the beginning. It is often no more than a softened form of the old abstract distinction between univocal and equivocal terms, which involves the false assumption that some words are perfectly definite; but even if we take the conception of degrees as not involving this assumption, still it cannot be

given a meaning such that the more indefinite words shall be those that most need definition, unless we beg the question and make the degree of indefiniteness depend on the need. At least we found reasons for seeing that if the need of definition is to be in proportion to the degree of indefiniteness, then the more indefinite words cannot be those which are grossly and obviously indefinite, nor those which are least carefully defined. It remains for any one who thinks he knows what the distinction *can* mean to give some acceptable explanation.

Even if the false assumption that some words are perfectly definite be not exactly involved, there can be little doubt that the slack popular view just spoken of gets much of its support from an incomplete recognition of the necessary indefiniteness of all descriptive words. For that reason it seemed worth while to set out expressly the manner in which this necessary indefiniteness is derivable from the necessary incompleteness of all description, and how that again is derivable from the fact that general names (however complex) cover individual differences. But the chief source of failure to grasp these truths and to follow out their consequences consistently is to be found in the common confusion between indefiniteness and ambiguity, due partly to insufficient definitions of the latter word, and partly to the fatal habit—again encouraged by Formal Logic—of considering words apart from their context, and so of trying to explain by reference to the nature of the word alone differences which belong not to the word but to its use in different particular contexts. Take any two predications with the same predicate term, and one may be ambiguous while the other is not, though in

both alike that predicate term is incompletely definite. When Shakespeare is called a poet, no one troubles about the definition of that term; but when it is applied in certain other cases we begin to ask how far it may be legitimately extended.

From all these considerations we found that the main remedy for the defects of the popular view is to keep in mind the distinction here drawn between indefiniteness and ambiguity, whether we use those names to express it or invent others which we may think better. Whatever name we use for that defect in assertions—*i.e.* in words as used—which is to be contrasted with indefiniteness in isolated words, the point to recognise is that every word, however definite or indefinite in itself, is free from useful doubt in some of its applications and open to useful doubt in others; and that when one of these latter occasions comes before us the mere number of the safe applications is not a relevant circumstance, since they are not the one in question. Thus we are not asked to regard class-names as universally unintelligible or misunderstood, but only to refrain from another equally unpractical mental habit,—namely that of declining to see the defect in an assertion's meaning because numbers of other assertions, something like it, escape that defect. The others have the same predicate term but a different Subject; and it is the difference in the Subject which alone occasions the doubt. So that the logical doctrine, expressed more generally, is negative in character. It does not say that particular doubts should be raised; but merely that, being raised, they cannot in the name of Logic be stifled without investigation. A given doubt raised in a case of assertion cannot be dismissed on

the ground that 'every one knows' what is meant by the word which suggests the doubt; or that in all but a tiny percentage of cases that word is applied with ease and correctness by all the world. Such a fact is irrelevant supposing an actual doubt to have already arisen. At most it means that confusion does not seem likely; it tells us nothing as to whether an important confusion has in fact been made.

Only in this way can we get the harmlessness of mere indefiniteness clearly contrasted with the harm of ambiguity, and see precisely what effect the latter has upon meaning. We then find that so long as a discovered ambiguity remains unremoved the meaning of the assertion in which it occurs has totally disappeared. It may of course be loosely called a 'vague assertion,' but it differs from those vague assertions which are merely incomplete—as all assertions must be—in the fact that it is challenged in a particular point. There are two senses suggested and the assertor is requested to choose between them, on the ground that until he does so there is nothing about which issue can be joined. Taken in one sense the assertion gives only stale information, and has therefore to that particular audience no interest; and until the audience knows whether it is to be taken in the other sense or not, there is nothing proposed for their consideration. In such cases they can only wait for further explanations, and in supplying them the assertor can give a kind of help that no one else can give,—that is to say, if he is desirous of making a meaning. He can choose whether to leave his statement in its present empty condition or to take the risk of saying something which may be disputed. Thus ambiguity does not merely spoil some ideal perfection of meaning

which a pedant may stickle for, or a sophist make a point of demanding, but destroys just that practical meaning or value which every assertion, as such, is bound to have.

The most direct bearing of these considerations is on questions which arise in the course of controversy, where one party is more confused, or more inclined to crooked ways, than the other; though, as will appear in next chapter, this is not their only bearing. So far as controversy is concerned, however, we have now seen how it is that the practice of demanding definitions plays so large a part as it does in all disputed questions. Ambiguity is fatal to a clear issue, and is only to be removed by means of definition; definition is thus the chief instrument in the process of getting an issue clear and so taking the first step towards reducing differences of opinion. And so long as any difference of opinion remains—so long as the process of reaching agreement can be carried further—the same operation is still needed in more and more subtle forms; for all disputes may, as we saw,[1] be in the end resolved into the doubt whether this or that supposed case of P really deserves the name. So that all through the process of reducing differences of opinion, from the most hot-headed antagonistic stage down to a 'question of fact' admitted as such by both the opposite parties, both fairness and success depend on our knowing clearly when and why definitions may be demanded; upon our knowing what names, on what occasions, can need to be defined. In all disputes, during the process of reduction, the question is liable to arise, which of the two parties is evading the issue,—the critic who

[1] Pp. 106, 136, 148.

demands a definition or the assertor who fails to meet the demand; the question whether the demand is irrelevant or whether the failure of definiteness entirely or only partly destroys the meaning of the assertion. This question cannot be intelligently answered so long as ambiguity is supposed to be the same thing as indefiniteness, or to differ from it only in degree.

It should now be evident that the demand for a definition gets its justice, and its effectiveness as a controversial weapon, entirely from its reference to a particular assertion made. The whole distinction between the just demand and the quibbling demand turns on the question of the particular reference. Words with a descriptive meaning, when taken apart from the assertions in which they occur, are always indefinite, or capable of creating an ambiguity, but it is only when they have actually done so—and therefore when they are considered in reference to their special context—that their indefiniteness has any effect on the meaning. And the effect it then has is absolutely destructive until the ambiguity is removed.

It should also be evident that when an ambiguity has been discovered, its removal is always an easy matter if the assertor really has a meaning and is willing to let it be known. The worst of it is that assertors often find it still easier, or in some way more satisfactory to themselves, not to confess to a definite meaning but rather to shift about between two meanings one of which is safer from attack than the other. When a statement is felt to be difficult to defend there are often strong inducements not to admit the difficulty, but rather to pretend or assume that it does not exist. Against a critic properly armed the shifty assertor cannot succeed in this attempt, but he often

thinks it worth while to try, or at any rate gives the plan a trial without much thought. Under all variations his mode of operation is then the same: the assertion he defends is not the assertion attacked, but (if he is skilful) one so nearly like it as to be easily mistaken for it. And the only remedy is to make the difference clear.

But, as we are now to notice, the bearing of these considerations upon the tricks of controversy is only a part of their service.

CHAPTER VIII

THE PROGRESS OF KNOWLEDGE

§ 49.—Questions of Fact and of Meaning

In § 45 we referred to the statement 'Here is a sovereign' as an instance of the use of a name which might cause ambiguity in spite of its definition being so well known for practical purposes as to give, on the whole, very little trouble. This instance, it will be remembered, was chosen as a fairly extreme case of a word which everybody knows the meaning of, and it was admitted that ambiguity is at present quite unlikely to arise out of it. Evidently the question whether an apparent sovereign is really a sovereign or not is more naturally viewed as a question of fact—as a question whether the particular coin is heavy enough, hard enough, and rings clearly —than as a question of the precise meaning of the word. The unlikely case in which it could lead to ambiguity would arise only if the now accepted tests should lose their value,—if, for instance, some ingenious chemist were to find out how to make 'real gold' sovereigns at a much lower cost. At present, however, and as far as we can see into the future, we know fairly well the conditions under which bad sovereigns are produced, and specially that they

cannot be made at a profit unless they are made of base metal; moreover they do not grow old or decay rapidly enough to cause difficulty. If, for instance, a bad sovereign could become a good one by necromancy, or if sovereigns were apt to go bad in hot weather, the defining line between those which are worth twenty shillings and those which are not would at once become a source of the most practical trouble.

The distinction between questions of fact and questions of meaning (or of words, or of definition), is one which, as we all know, is often referred to in arguments. That the difference is not as a rule very clearly apprehended may be seen from the fact that the parties arguing often fail to discover the verbal character of the question until the dispute has lasted a long time. Both sides commonly begin by supposing that the point at issue is a question of fact; and then, after they have proceeded on this assumption until each has unburdened himself of his opinions, suddenly out flies the bottom of the controversy and the opponents become aware that no facts are in dispute and that "after all, it is only a question of names." And then their wisdom after this event usually leads them to think that the original question was trivial; they fail to see that the clear reduction of the dispute to a verbal one is itself a step gained in advance of their former position.

We cannot wonder, however, that the distinction between questions of fact and questions of definition is vaguely apprehended when we examine its nature. The point of it is the assumption that some questions do, while others do not, admit of misinterpretation;

which is again the untenable assumption, discussed in last chapter, that some words are, while others are not, 'indefinite or ambiguous.' Such a distinction, we saw, does not admit of any careful application; and it tends moreover to obscure the connection between the finding of ambiguities and the progress of knowledge.

What is it that makes one question less liable to be misinterpreted than another? It is not merely the familiarity of the words in which it is expressed, for no words are more familiar than the epithets of praise and blame which, more often than any other kind of words, lead to confused issues. Nor can it be the simplicity of the fact itself, for that, as we have seen,[1] is delusive. And if we make the distinction one of degree, saying that all questions below a certain degree of complexity are questions of fact while all above it raise questions of definition before the facts can be decided, then we get into precisely the same kind of difficulties as those we encountered in § 41 about the assumed degrees of indefiniteness. If all facts are infinitely complex, what shall be meant by degrees of complexity? Can we give the phrase any meaning which does not involve the circular explanation that questions are about a definition where the facts are sufficiently complex, while the sufficient complexity of the facts is evidenced by the felt need for disentangling the several strands of possible meaning?

But if we make it turn on the *supposed* simplicity of the fact in question, all these difficulties disappear, and, though the faults of the distinction itself then come to light more clearly than before, our very

[1] See § 13, and pp. 94, 173.

recognition of them helps us to understand just that source of progress which is otherwise left obscure. Though there cannot be any clear opposition between two classes of question on the ground of real simplicity, yet on the ground of supposed simplicity, or seen complexity, it is plain that a distinction of degree is easily possible. Indeed, whatever practical value the distinction has evidently lies in marking off those questions which *may be taken* as simple from those which may not. For various reasons, among which economy of time is one of the most important, we are driven to recognise plenty of questions which are never likely to need carrying up into the region of difficulties of precise description, since they are sufficiently answered on a less philosophical level; and it is convenient to group them together under the common designation 'questions of fact,' so as to keep clearly in view the suitable means of answering them. It is a working distinction, analogous to that which is made in our Law Courts between what is 'evidence' and what is not; and, like all working distinctions, it is sure to lead to injustice here and there if we trust it absolutely. Science, with more time at disposal than the Law Courts have, does not insist on any hard distinction between what is evidence and what is not; that particular time-saving apparatus is found too untrustworthy for the minutely accurate inquiries which are the special business of science. And logical science cannot insist on any sharp distinction between questions of fact and questions of definition. Indeed, we have already[1] gone further, and recognised that every question of fact is a question of theory about a

[1] § 31.

fact; and in so far as it is a difficult question, not easily reduced to a simple and definite test, either itself is or else involves a question as to the proper application of some class-name.

When we have once recognised that questions of definition are those questions where the point at issue is *seen* to be complex, it is only one step further to the recognition that since all men's insight into complexities is not equal, the same question will seem to one man a question of fact while to another it will seem to require preliminary definition. Though there may be some extreme cases on either side, about which no difficulty ever arises, there are evidently also numerous questions that are taken differently by different people.

For instance, two or three centuries ago the question whether God exists was regarded by almost every one as a question of fact, and even at the present time there must be millions who so regard it, whatever shade of belief or disbelief or reservation of judgment they profess or feel. But the same question is now seen to be ambiguous by a minority who have allowed themselves to recognise the variety of the meanings in which it may be taken. Taken as Spinoza took it, assent becomes a truism; taken as the Mahdi or Oliver Cromwell took it, doubts have a standing ground. The old apparent simplicity of the question is thus giving place to a view of its complexity, and instead of remaining confessedly a question of fact, like the question about the existence of a hitherto unknown planet, it is beginning to be taken as a question whether this or that conception of the Deity is a truthful one,—the conception, for instance, that 'God' delights in burnt offerings, or is likely to

wreck a Sunday excursion train. The schoolboy's answer that Homer never existed, but only some one else of the same name, marked a stage intermediate between taking the question of Homer's existence as simple and recognising its complexity.

If we now inquire what is the extent of this intermediate class of questions, which are questions of fact to one person and questions of definition to another, we shall find it very difficult to put a limit to them, even approximately. The limit on the one side is fixed pretty clearly, at a given date, by the fact of no ambiguity having yet arisen—as, we will assume, is the case with the word 'gold'; or as a few years ago was the case with the words 'diamond' and 'ruby,' when the nearest imitations were more easily distinguished from the real ones than they now can be. On the other side, however, the limit seems quite impossible to draw except in a high-handed way which is foreign to the spirit of philosophy. It is generally easy to assume, of course, that those who take as a question of simple fact some question which we ourselves regard as verbal are people who need not be considered; but when it comes to attempting to draw a clear line, on any such basis, between questions of fact and questions of definition, we open the door to some very troublesome doubts as to the justice of the assumption in particular cases. Clearly it will not do, at any rate, to make a general claim to settle such doubts out of hand,—it would not conduce to the habit of truth-seeking, but rather to that of neglecting to hear opponents. It is only too easy to hold the view that our opponents, as such, are people to be left out of account.

As a result of the inquiry, then, how to distinguish

questions of fact from questions requiring prior definition, we find that the former class exist on sufferance, for the practical purpose of reaching some sort of conclusion in a reasonable time; that in strictness all questions either now are or are liable to become at any time, questions of definition; and that even if we were content with a less strict view of the matter, still the class intermediate between questions of fact and questions of definition is of large extent, and its boundaries cannot be drawn except by striking a rough average of common-sense opinion and talking about "people whom we need consider." In this indefinitely large class of questions the need for the definition of their terms is recognised to a different extent by different people, and those who recognise it less tend to regard them as questions of fact. So that questions of fact, as a class, are constituted rather by the way in which people take them than by any quality which belongs to themselves. Though I may obscure the truth and hinder the progress of knowledge by assuming it to be a simple question of fact whether ghosts exist, or whether animals reason, or whether species were created, still, if I so take the question it is a question of fact for me while it remains in this stagnant condition. To answer a complex question as if it were simple is to end it forcibly; to find its ambiguity is to carry on the search beyond that delusive end.

It appears, then, that although there are at all times numerous questions which really deserve to be treated as questions of fact, we can no more be sure of recognising them correctly than of recognising correctly unambiguous terms. To accept as satisfactory the distinction between questions of fact and

questions of definition is a shortcoming of the same kind as the contented acceptance of the distinction between univocal and equivocal terms. In the abstract it is true that sometimes the doubt whether S is P or not P properly turns on the meaning of P, while at other times it properly turns on the facts about S. But in actual cases where the doubt has arisen the separation of these two elements of it is often impossible except at a serious risk of misunderstanding the question and following irrelevant issues. And this applies with greatest force where the error combated is important without being obvious. The more we take really disputable questions into account, —questions where the erroneous view is plausible and has vitality,—the more we find that to doubt the accuracy of the statement is to suggest that a term which occurs in it is used so as to hide an important difference. It is because the statement 'Here is a sovereign' can at present have its accuracy tested in a moment, that we call the question a question of fact; but the extent of our agreement with a religious or metaphysical doctrine is less easily distinguished from the extent to which we regard it as false and misleading.

Although there is no way of estimating, even approximately, the relative number of questions which deserve to be taken as questions of meaning, and although such an estimate, however correct, would have no bearing upon an individual case, yet it may be worth while to notice briefly a few of the commonest causes which render questions delusive when supposed to be questions of simple fact. The question whether S 'exists' is perhaps the most obvious type of them, and the instances quoted just now will suffice

to remind us of many others. But the question whether S is P tends also to become a question of meaning in so far as the difficulty of the decision becomes serious. It is fairly evident that a large number of our most familiar predicate terms refer to qualities for which our tests are extremely defective. As we noticed above (p. 207), most epithets of praise or blame are of this nature and yet are widely used without much suspicion on the part of their users that any difficulty can attach to their interpretation. The absence of such suspicion is the measure of our ignorance of the way in which qualities and defects are bound up together, and the way in which hidden or unconscious motives alter the character of an act. It is rather the child than the man, rather the man in the street than the man in the government, who can be inflamed and carried away by words that are used to veil or exaggerate the facts.

Then, not only are our tests defective, but our very standards are often quite undetermined. Witness the wide differences of opinion we nearly always get as to the merits of any book or play, where the reader or playgoer pays scant regard to any other standard than his own mood of the moment. And even after we have risen to the conception that qualities are to a great extent relative to the individual for whom they exist (so that meat may on occasion be correctly described as poison) there is another and more subtle source of difficulty in the fact that qualities, by whomsoever observed, are never entirely in the thing but are partly the outcome of its surroundings. If you fill up the valley you remove the hill; if you deprive a man of food or air he ceases to be a man; and our moral character depends in part upon our

income and other circumstances. 'Things' have thus a highly precarious existence. In this statement, or in the familiar saying that circumstances alter cases, a great part of the reason why questions of meaning tend to appear as questions of fact finds concise expression. Another conception by which the same truth may be pictured to us is that of unstable equilibrium. Things as we know them—things as they are named and conceived—are balanced for a time, and their fall on one side or other generally begins before we are aware of it. A little more of this quality, a little less of that, and the balance is overthrown. Then, often quite suddenly, the change is noticeable; A has become non-A by a transition which in its later stages is rapid. The thing called A has disappeared or 'perished,' and something which we cannot help calling non-A is there in its place. Our vision of these changes, and of the difficulties they cause in applying names correctly, depends partly on the state of our knowledge and partly on the trouble we choose to take. The more closely we look at anything, the more we see that the fusion of A and non-A is everywhere to be found by those who care to search for it; for quality always implies action amid surroundings, and the thing itself must change if its setting changes. Everything exists only in a setting of some kind, and its own character is partly created by that setting. Thus even our most durable coins have an element in them which is the reverse of durable, namely their value expressed in goods. The very thing which coins exist for the sake of measuring is only measured by them in a questionable way.

§ 50.—The Virtue and Vice of Casuistry

Having now seen how the plausibility of an inaccurate statement depends upon its unsuspected vagueness and is destroyed by bringing that vagueness to light and so obtaining further definition, the next step is to notice that normally the progress of knowledge consists in small piecemeal corrections of inaccurate statements which are accurate enough to be already in possession of the field, and whose inaccuracy (or lack of sufficient definiteness) has hitherto escaped attention. Here and there, no doubt, some gross error gets corrected, or a wide new generalisation is suddenly reached, apparently almost by accident; but these cases are comparatively rare, and the former especially seems likely to become continually rarer as knowledge increases. At any rate most of the work of adding to the store is done little by little, by means of the constant interplay between newly-observed fact and more definite theory, or between improved theory and more definite conception of fact, —which we have noticed already in § 27 and elsewhere. To recognise this is to recognise the part that is played in the progress of knowledge by (what we must here call, for want of a better word) casuistry.

Such recognition is, however, hindered in many ways. As we saw in last chapter, it is hindered by the confusion between indefiniteness and ambiguity, and by the group of half-truths which support that confusion and draw strength from it. But a more direct obstacle is to be found in the excess of zeal with which the opponents of casuistry have, with

the best intentions, gone about their work; so that now the very name of the thing has come to have an unpleasantly evil sound. Before it became thus degraded it used to mean merely the practice of testing the value of general rules by applying them in particular cases, especially cases of some difficulty; at present few people would take it in this impartial sense.

The opponents consist chiefly of two parties. On the one hand there is the party of conservatism, including nearly all varieties of that cult, whose best motive is to guard the hard-won treasures of human thought against the spirit that denies or doubts; on the other hand there is the party of action, whose best motive is to watch and protest against the waste of time due to what they regard as super-subtle inquiries. A third party might also possibly be distinguished whose inner motives are more personal, and who hate casuistry because it so often clips the wings of their own soaring assertions. But since they are shy of confessing this, and usually adopt for their ostensible motive one or both of the two above mentioned, we need not here think of them as a class apart. Indeed, hatred of opposition is rather a mood than a motive,—a mood to which even people of most irreproachable motives are liable. Thus our quarrel with the opponents of casuistry does not necessarily involve any quarrel with their motives, but only with the frequent clumsiness of their procedure, with their frequent lack of discrimination between the good and the harm of different sorts or occasions of casuistry, through their excess of zeal.

Putting out of sight, then, the unfortunate associations that have gathered round the word, the process

it is here used to refer to is not quite the same thing as the finding of ambiguities, for it covers also the unsuccessful search for them. Nor is it quite the same as experimentation, though that includes seeking as well as finding; or at any rate the analogy between casuistry and experimentation is somewhat disputable or difficult to see except where the experimentation has passed its earlier stages and has plainly for its object the greater refinement and definition of some accepted general rule. This latter kind of experimentation, however,—on which the more gradual improvements of science mainly depend,—may serve to help us to see the value of 'casuistry' as well as the source of any harm that may occasionally be traced to it either in the shape of mere waste of time or through the unsettlement of rules and principles.

No doubt a certain amount of time must always be wasted in the earlier stages of experimentation,—those which precede the putting of 'prudent questions.' But inasmuch as the less instructed inquiries pave the way for the more instructed ones, it would be a mistake to count them as wholly lost labour. 'Fools' experiments,' as Darwin called them, have a value and interest which he instinctively recognised in practice, though inclined to laugh at himself for doing so.[1] Besides, it by no means follows that because you do not find what you set out to look for therefore you find nothing else. The search for general definitions—as contrasted with the search for ambiguities and with the attempt to get an

[1] See *Life and Letters*, vol. i. p. 149. On p. 150 it is noticed that "while working upon the *Variations of Animals and Plants*, in 1860-61, he made out the fertilisation of Orchids, and thought himself idle for giving so much time to them."

ambiguity removed—is an instance in point. On our own principles, it would seem, to expect to get a satisfactory general definition is to expect to catch a chimera, since however far we carry the pursuit there is room for further inquiry. So there is; and yet even unsuccessful inquiries after a definition often have an indirect value. It is not in the form of a neat verbal result that the search for a general definition ever finds its best justification. Progress is made, as a rule, rather through baffled attempts at definition. Gradually, as the problems involved in the search come to light, we discover unsuspected ambiguities, and in removing these we correct defects in our general knowledge. Granted, for instance, that when we seek for a satisfactory general definition of 'Truth' we never actually get it; still, we get a clearer view than before of what is involved in calling an assertion true.

Similarly with the unsuccessful search for an ambiguity itself; there also we may get by-products. In the first place, so far as it is true that the discovery of ambiguity is subversive of previous faith, it is equally true that the result of an unsuccessful search for ambiguity is to establish the faith on a firmer foundation than before; and in the second place, whether the search be successful or not in regard to the particular assertion which starts the inquiry, it can scarcely avoid incidentally bringing to light ambiguities in other assertions which are in more or less close connection with it. This follows from the fact, noticed in Chapter I., that we cannot extend concrete knowledge in any direction without altering to some extent the previous meanings of words.

The fairest general account, however, of the value and harm of the practice of searching for ambiguities is to be found when we consider the part that is played respectively by ambiguity, and by the removal of ambiguity, in the progress of knowledge. It should be remembered that though the critic who discovers an ambiguity complains that to him the meaning of the assertion is non-existent, that is not by any means the worst of the harm he finds in it. There is its effect on other people to be considered,—on those who do not see the ambiguity it contains. What it provides for them is an opportunity of shifting about between two meanings, one safer from attack than the other; with the result that it hinders the recognition of the defects of a half-truth, and to that extent obstructs progress. In its cruder forms we have all made some acquaintance with the old controversial trick of retiring into the safer of two meanings when a shifty assertion is attacked, and emerging into the less defensible meaning when the attack blows over. For instance, the well-known aim of all oracular utterances is that of making the statement so vague that its lack of real foresight or insight shall escape detection. Now the fact that we do not all agree in the way we distinguish true wisdom from the merely oracular imitations of it should suggest to us that perhaps there is some real difficulty, on occasion, in applying the distinction. And it is easy to see how the difficulty arises. If it is simply 'hedging' which makes a statement oracular, then all generalisation lies a little open to the charge. Generalisation, when expressed, aims at being *literally* true; and one of the conditions of its being so is that the letter of the assertion shall be just a little vague.

The fact that vagueness is a necessary condition of all generalisation is involved in the fact that all general names are necessarily indefinite. And since we are forced to act upon approximate knowledge or else cease from action altogether — an alternative which no one can adopt—even statements which suffer a little from vagueness, and therefore provide opportunities for hedging, have a practical value; they are better than nothing. Hence it is that our chief expedient for dealing with difficult matter has much in common with the practice of shifting about between two meanings. Without what is called the imaginative element in science, our knowledge of Nature could not have reached even its present modest proportions. The leap from admitted fact to unadmitted is, from one point of view, a shift between two meanings. Our experience that S is P in a particular case or set of cases suggests that possibly S in a wider sense is P; and at any rate if we bind down 'S' to mean just the cases observed and no others, we cannot make a single step forward in generalising. But we never do so bind it down; we leave the margin of its application a little vague on purpose, and cast about for further hints to guide us in extending it, or to check our first inclination to extend it too widely.

Since, then, vagueness in itself is occasionally a virtue, we cannot condemn oracularity so long as we mean by it simply vagueness of statement. The intellectual sin, the controversial weakness, lies not in the mere shift between two meanings, but in the spirit in which it is made and in the consequent attitude towards criticism. To play the oracle is to make a pretence of knowledge, not merely to have

faith where vision is dim. And though in the subtler cases it may sometimes be difficult to distinguish between faith and make-believe, and between make-believe and sham, at any rate there are thousands of everyday matters where the difficulty is almost non-existent. As a simple instance we may take the difference between the old weather almanacs, which used to predict for a year ahead, and the modern weather forecasts in the daily papers. The latter predictions are, indeed, a little less vague than the former, but even they depend for their success to some extent upon their vagueness. The whole country is divided into a few sections of considerable size, and a forecast—itself often somewhat vaguely worded—given for the whole of each section. Areas much smaller than these would leave room for the forecast to be both right and wrong at once. But the real difference lies in the attitude taken by the two different sets of prophets. The one set lived by concealing their ignorance and evading criticism; the other set freely admit their ignorance and look to criticism as the best means of reaching fuller knowledge.

Secondly, just as the practice of shifting between two meanings is false or truthful according to the motive which underlies it, so the critical inquiry itself is capable of becoming, according to its motive, either a valuable aid in the search for truth or a weak and silly obstruction. The practice of fishing for possible ambiguities can no more be in itself condemned than the plan of leaving a margin of vagueness for the sake of getting a working belief. Each method is needed if knowledge is to grow. Just as no generalisation can be formed without going through stages of incompleteness, so no ambiguity

can be clearly seen without having first been vaguely suspected. In the one case as in the other, all depends on the honesty of the motive and on readiness to admit the tentative nature of what is being done. The tentative process need not involve any pretence, and it is only pretence that makes a quibble of either opposite kind.

On the whole, then, we seem driven to admit that the question whether casuistry is a virtue or a vice is one of those over-wide questions which do not allow of a simple answer. The only fruitful question is whether in the particular instance of its application it can be justified or not. But it is at any rate a gain if we have clearly seen the folly of any general condemnation of the practice of facing possible exceptions to a rule. The war between the adherents of simple rules and those interested in exceptions is not waged only on those fields of thought where there is much to be said for the bliss of ignorance. The difficulty is of greatly wider range, and notoriously there are generalisations which do not deserve any reverential treatment. No one, we may presume, would carry his dislike for casuistry so far as to condemn all criticism of the loose rules which are often made about classes of people, such as negroes, or minor poets, or foreigners, or the upper or lower classes of society. Every one knows that such rules often have a great deal of truth in them, and yet nearly every one (when in a reasonable mood) recognises that they can be believed too rigidly. And between the two extremes—between the rules which it is better not to criticise carefully and those which are obviously defective—there is the largest class of all, the half-truths which

are nearly true and yet will bear improving. As moral casuistry may be a symptom of the need of a moral tonic, so the lack of casuistry in other subjects may be a symptom of the commonest intellectual vice. At any rate it is mainly through recognising the complex relation between theory and fact, or rules and exceptions, that we can best understand the growth of knowledge, especially as regards the difficulties under which it labours and the hope that for ever leads men forward in spite of constant partial failure.

§ 51.—The Function of Scepticism

From the two preceding sections we may draw some consequences which have a bearing upon that old issue, the place and function of Scepticism in philosophy.

The name scepticism, like casuistry, is one of the many words which have degenerated through the influence of their traditional denotation; so that to say anything in favour of scepticism is sure to lay one open to the attacks of those who mean by it nothing more than a special form of dogmatic metaphysics which has long been discredited and which it is unlikely that any one now upholds. Probably there is no living philosopher who ever overlooks the fact that in so far as we claim to know anything —even to know the impossibility of this or that kind of knowledge—our scepticism falls short of completeness. Nor, we may equally assume, is there any philosopher who does not know that denial (*i.e.* intelligent denial) rests on and requires something taken as known. To deny without reasons for denying would of course be to deny in language

only, not in thought, though to deny intelligently and yet without *sufficient* reasons for denying is notoriously possible.

Is doubt, like denial, thus indirectly assertive? Intelligent doubt, or reservation of judgment, differs at any rate from intelligent denial in one respect, —that it does not necessarily presuppose a knowledge of what the assertion is that you are asked to accept. You cannot deny intelligently without knowing what it is that you are denying, but you can intelligently reserve judgment when confronted with a statement which you find to be ambiguous. Or rather, that is the only intelligent attitude in such cases; to accept or deny or dispute the statement, as if it really conveyed an assertion, would be to show a lack of intelligence.

These elementary truths seem perhaps hardly to need stating. Yet there are still some philosophers who can at any rate appear to forget them when the juggle between doubting intelligently in the one sense and doubting intelligently in the other is needed to support a weak case. When you have pointed out that some statement of theirs is ambiguous, and therefore (till the ambiguity is removed) non-assertive, they pretend that you can only have disputed its truth, and not its assertive force. They would hardly, perhaps, go so far as to say in so many words[1] that there is no such thing as the latter

[1] At times they come rather near this. See, for instance, Mr. Bradley's *Appearance and Reality*, 2nd edition, p. 559. He has indeed managed to obscure his argument by giving also a plainly impossible account of his opponents' views,—an account the character of which is further suggested by the remarkable absence of any attempt to support it by quotations. However, the sober and relevant part of his contention may be found if we neglect this false issue and all that belongs to it. There remain the two statements that "to question or doubt intelligently you must understand," and that "if about any theory you desire to ask intelligently the question

kind of doubt, but they do their utmost to put it out of court, and they speak as if the former kind alone were possible,—the kind that (like denial) comes into operation only after the ambiguity, if any, has been removed. Thus the dilemma into which they try to put their critics is the familiar one of "Heads, I win; tails, you lose"; for if you attack their statement without observing its ambiguity they can always meet your objections from the safest of cover; while, if you ask them to choose between its possible meanings and to abide by the choice, then they claim that you have yourself confessed that you do not understand the assertion, and therefore that your doubt is 'unintelligent.' This attitude towards criticism reminds one a little of the Boers' reported complaint at Poplars Grove, that it was not fair to turn their positions instead of delivering a frontal attack,—that it was not playing the game. After all, the business of the attacking party is not to walk into traps, but rather to avoid them. Still, it was of course annoying for the Boers, after having dug their trenches with so much labour and education. No wonder they fumed as they ran away.

But we are not here specially concerned with the humours of controversy. Our question is, rather, as to the nature of the scepticism which declines to stultify itself by claiming to know more than it does

'What does it mean?' you must be prepared to enter into that theory." The second of these statements seems to admit (what the first expressly denies) that there can be intelligent inquiry for a meaning; but the admission is deceptive, since we are left asking how the required preparation is to be obtained in cases where you have found the theory ambiguous. If by 'prepared' he merely means 'willing' then he implies that the request for the removal of an ambiguity can never be seriously meant. But I presume Mr. Bradley knows better than that.

know about the limits of knowledge. Of course it is open to any one to say that a scepticism which is wary enough to do this is not the real thing, and does not deserve the name,—that, in short, no scepticism is genuine unless it departs from its own original idea and becomes dogmatic. In the same way it might be argued that history is not history unless it is biassed and therefore largely false. These are matters for those who care about them to settle for themselves. On the principles here throughout admitted it is clear that the question what name shall be given to our particular 'ism' cannot be taken as of chief importance; far be it from us to insist on this or that label or banner so long as the views themselves are understood. What we cannot accept is the argument that a stated doctrine stands above the reach of any doubts because its assertor chooses to ignore all doubts except those which he can safely answer. We cannot allow him, without a protest, to hold the too convenient position that, if we are to criticise his doctrine at all, we must do so by putting out of sight our only real objection. If the defendant could always dictate to the complainant the way in which the latter's case should be conducted, what a comfortable time there would be for defendants generally.

Whatever name, then, may be thought most suitable to the position we have here reached as regards the trustworthiness of human knowledge, the position itself may be provisionally described as follows:—

First, we see no reason for allowing that purely abstract truths—of which 'A is A' may be taken as the type—are *judgments;* they represent, rather, the prior conditions of judgment; in themselves they

involve no choice between yes and no, and a mind from which they are absent would be wholly incapable of thought.

Secondly, judgments, we have seen, may always be analysed into a part which is admittedly theoretical and a part which is taken (with certain reservations) as fact. And the closer we look at either of these elements of a judgment the less can we feel convinced that they are final decisions, or safe against future correction and improvement. As the past history of human judgment shows, our theories are constantly turning out to be more vaguely apprehended than we had hitherto supposed,—are constantly found to be statements of rules with an insufficient regard for their exceptions; and our 'facts' at the same time are found to be loaded with unsuspected theory. But we can also see reasons for expecting this process to continue far into the future. Over and above the defects of our knowledge which are due to the mere limitations of our senses, and to our other physical disabilities such as that of being in two places at once, the very instrument by which all our reflective thought is carried on is itself essentially a source of error; both our theories and our facts are liable to the defects which are inherent in language. Descriptive words must be employed whether in stating or conceiving our theories and facts; and descriptive words, as we have seen, are never fully descriptive, and thus leave room for ambiguity and consequent plausible error. The theory that from M follows P has to be connected with the 'fact' that S is M, in such a way as to rule out the objection that M in the two premisses does not mean quite the same thing. Until words can be freed from their vice of indefinite-

ness—and no one at present has the remotest conception how this can be done—the end of the process of improving our judgments is merely wherever we choose to make an end of it for the time.

In practice the greatest difficulties are encountered when it is not clear which of the two elements in the judgment (fact or theory) is most in need of correction; but since all correction must have a definite point of attack, we can in these cases only consider each element in turn. And in both alike the procedure is the same. The theory that from M follows P is attacked by the suggestion of exceptional cases which show the need of further defining M, so as to state the rule less vaguely. The supposition that the predicate M is rightly applied to S involves the theory that the difference between S and the less doubtful members of the class M has no importance for the purpose immediately in hand; and a discussion of this theory involves an answer to the question how the class M shall be sufficiently defined.

On the whole, then, it appears that the weak point in human certainty is the need of expressing our judgments in language, or of tacitly conceiving them as if they were expressed in language. For on the one hand we cannot shake off our inveterate but vague assumption that the 'Laws of Thought' are *somehow* true, and on the other hand we cannot apply them to actual words used without making the untenable assumption that ambiguity is impossible,—untenable because, as we have seen, it lies in the nature of language that descriptive words shall, as such, be liable to cause ambiguity. That is the least assailable ground of the sceptical difficulty that exists at the present time,—the difficulty which the older

sceptics may have felt but which they did not clearly recognise.

Thus when it is asked whether we know Reality, the only possible answer seems to be that we do not know how much or how little we know it. What we do know—subject, of course, to future correction—is that our judgments always contain the seed of possible error. Along with the unknown amount of truth they contain goes an equally unknown amount of correctibility, and the whole history of human thought is a history of the partial correction—or at least supposed partial correction—of previous errors. Only in this way and to this extent are we driven to recognise a difference between Reality as it is and Reality as it is thought,—only so far as the refusal to recognise it would amount to the doctrine that there is no such thing as error so long as self-contradiction is avoided; or that human knowledge, when self-consistent, is not (to an unknown extent) in constant need of partial correction.

Is this position 'dogmatic'? Only if all reasoned belief is dogmatic, even when we are fully prepared to reconsider it for further reason shown. The mere name 'dogmatic' need not frighten us, if it be meant to spread so wide a net as this. Our view of the nature of language, and of its connection with thought, is at any rate not put forward otherwise than as a challenge to objectors to find definite fault with it. Our positive basis claims to be no more than a web of theories, and to hold good only until it shall be superseded by improved theories of the same improvable kind. That is to say, it puts forward—not as a piece of absolute truth which all men must accept or be damned, but as a theory openly rested on reasons which challenge the

fullest criticism—the assertion that human knowledge is progressive, and therefore imperfect and liable to an unknown amount of correction. Imperfect knowledge, as Mr. Bosanquet says,[1] only becomes false when mistaken for perfect knowledge; and the function of scepticism is precisely to prevent this mistake so far as it can. As to the question whether the imperfection is eternal or not, our position is that, as far as we at present see, it is so, or that an end to the process of gaining further knowledge is no more conceivable (by us at present) than an end to Space or Time. Since these views themselves lie open to correction, their statement is only a request to let the detailed correction begin.

It is in this way, then, that we disarm the wordy arguments which seek to prevent scepticism from having a standing-ground. Under whatever form they appear, in the end they all amount to the doctrine that sceptism *must* contradict itself and become dogmatic; but where is the contradiction in admitting that we may be mistaken in regard to any piece of theory—even, for instance, in this piece of theory itself? Granting that the assertion "I am sure that I am everywhere fallible" contradicts itself, how can the same objection be brought against a mere request on the part of the sceptic to hear what definite fault can be found with the reasoned theory that human knowledge is progressive and therefore imperfect, or with the other reasoned theories—as to the part played by language in judgment, or as to the inevitable defect of language—on which our view of man's fallibility is grounded, and by which its very meaning is explained? Assertion in itself is not

[1] *Logic*, i. 223.

dogmatic, but only becomes so when we seek to evade arguments brought against it. To confuse assertion with dogmatic assertion is to go back to over-simple notions of the nature of Truth. When we recognise that all truth as stated contains an unknown amount of error, we cannot easily be dogmatic in any sense that carries blame.

Among the consequences of this general position, two may be mentioned as having a special interest for Logic. First, the clumsy abstract distinction, with which we all start, between good and bad reasoning, or between 'logical proof' and the absence of logical proof, cannot be maintained except as a mere figure of speech, like 'perfectly definite' or 'completely descriptive.' In its place we have the distinction between sufficient and insufficient proof, with an implied reference to some purpose for which the proof in question does or does not suffice. It is only in this way that we can accept and yet render harmless the theory that all known truth is progressive and liable to alteration, and that therefore absolutely certain proof of any assertion is a thing unknown. All proof is bad in this sense and to this extent; and accordingly if we are to make any distinction at all between good and bad proof it must be on some less exalted level than the hope of reaching absolute certainty. It is not possible indeed to set up any general standard to correspond to what are commonly and vaguely referred to as 'practical purposes,' for the simple reason that the practical purposes for which proof is required are extremely various. For instance, life and death at times depend on correctness of judgment, while at other times our desire for accuracy dwindles away to nothing. Proof 'for practical purposes' thus

covers every variety of standard used. We need not, however, make more of this difficulty than it deserves. All that is required, in any particular discussion, is an agreement as to the purpose for which the proof is to be sufficient, and though this may of course be difficult to get with precision, a roughly approximate agreement will at any rate serve for a beginning, and you can hardly avoid making either the agreement or the difference of standard more precise as the discussion proceeds. In one respect it does not much matter which of these results occurs. For when an assertor can only defend his position on the ground that the tests you are applying are too severe, then—always supposing you are aiming at something short of an impossibly absolute certainty—your difference of standard is not very important, because it causes no confusion. The two parties are then in the position of those who agree to differ; that is to say, each may admit the other to be right, 'from his own point of view,' while preferring another point of view for himself. Meanwhile, even with so little result as this, some new light is usually thrown on the truth of the matter disputed. A discussion which ends in an agreement to differ is a very different thing from a discussion which ends in a deadlock.[1]

Secondly, the view that in all judgment there is room for the misconception of fact involves the admission that any correction to be made in a judgment can be only partial. Just as there cannot be statements of fact which are necessarily true, so there can be no belief which is completely false. Since a false fact is a true fact misconceived, there is always

[1] A deadlock arises only where either party puts an end to the discussion against the desire of the other, whatever his motive may be.

a basis of truth in the falsest possible fact. That is indeed one reason why (as we saw at p. 127) it is useless in argument—except on the rare occasions when strong language is really strong—to declare that a statement is 'wholly false'; the more effective thing to do is to get as near as possible to the point at which the misconception crept in; to see the error being added, by mistake or misrepresentation, to the true fact that underlies it. Only so far as this can be done is the error explained, or its nature clearly seen. No refutation can be crushing or convincing so long as it fails to give some hint as to what the error consists of,—*i.e.* where it departs from the truth.

Our scepticism, it will now be seen, consists of a recognition of the defects of knowledge only in the hope of helping knowledge forward. Among its leading principles are these:—that doubt is always lawful but not always expedient[1]; that human fallibility is only worth remembering for the sake of discovering and correcting actual errors; and that beliefs may be unquestioned without being unquestionable. So far from using the notion that man is fallible as an excuse for despair, or for tendering the advice that nothing should ever be believed, we use it as a justification of the effort to improve our knowledge little by little for ever.

And such being the nature of this kind of scepticism, it follows that the determination to feel our way towards truth by discarding all visible error necessarily employs the method of casuistry at every step; necessarily therefore resolves itself into a search for

[1] We should also admit that doubts are not only not always expedient but are not always even possible. That is to say, a given person at a given time may find a given doubt beyond his power; and for no human being is anything like consistent universal doubt a possibility.

latent ambiguities, a search which is successful in aiding the progress of knowledge in so far as it brings actual ambiguities to light. Thus the interest in finding ambiguities is not controversial merely, but is co-extensive with the need for distinguishing within a class two portions which for some clearly-seen purpose are essentially different. And this movement of thought towards clearer definition is at once the effect and the cause of every step in the progress of knowledge.

I have read with interest Prof. Watson's criticism on my supposed position, in his *Outline of Philosophy*, pp. 329-336. While it shows that some of my former expressions were open to genuine misinterpretation, it allows me to think that the statement just given will suffice to explain them. If not, I shall be happy to continue the discussion at any time. The following additional points, however, may be noticed at once:—

(1) The complaint (p. 332) about my use of the word 'perhaps' originates in Prof. Watson's having taken it out of one sentence and put it in another. But this I assume to have been a mere slip, and there is no need to make much of it. A real difficulty is to know how to please a critic who, when I leave out the word 'perhaps,' complains of my dogmatic confidence, and when I am supposed to put it in complains of my excessive caution. The truth is that none of my assertions are put forward except as liable to the risk of error, and as asking to have the error shown. But would not readers have a just cause of offence if a writer were to repeat this disclaimer expressly in every separate sentence? This is chiefly a question of style and literary manners. We cannot in the name of philosophy decide the question whether a given assertion is dogmatic or not merely by the absence or presence of verbal expressions of doubt in the sentence,—expressions which the writer takes to be needed, or to be superfluous, on literary grounds alone. The dogmatic quality of assertion, I submit, can depend on nothing but the assertor's attitude towards criticism.

(2) In the passage cited, I did not call the Laws of Thought

'anthropomorphic,'—a description of them which would seem to me nonsensical; the name was attached, rightly or wrongly, to a certain conception of Reality. And unless Prof. Watson would maintain that it is impossible for a human being to have any excessively anthropomorphic conceptions, his argument seems to lead nowhere.

(3) Prof. Watson is, I think, scarcely just towards Mr. Bradley in saying (p. 334) that he meant no more by claiming 'unconditional knowledge of Reality' than to affirm that 'Reality is absolutely complete.' If, however, this were so, my objections against the truistic futility of Mr. Bradley's main positive result would be all the stronger.

(4) "It may well be that Scepticism . . . has a deeper meaning when it is viewed merely as a stage in the process by which higher truth is reached." But that is exactly how I have always viewed it; and that conception of it is one reason why I would avoid identifying 'Scepticism' with those so-called sceptical positions only which do not admit of useful employment. The last paragraph in Prof. Watson's criticism makes me wonder whether, apart from disguises of banner and shibboleth, his view and mine are really as divergent as a healthy party spirit might desire. So long as we both recognise that 'Reality as it is thought' need not be the same as 'Reality thought correctly,' there is still some work left for science and philosophy to do.

PART III

THE LEADING TECHNICALITIES OF FORMAL LOGIC

CHAPTER IX

KINDS OF NAME OR TERM

§ 52.—'Logical Character'

We have now to observe in some detail how the leading assumptions[1] of Formal Logic introduce confusion into the technical terminology and render it useless for expressing logical doctrines with precision. It will not be possible to deal with these assumptions in perfect independence of each other, since they are only different aspects of the same tendency to pay excessive attention to form, and it sometimes happens that one of them aids and abets another. But a rough separation of them may be made if we follow the usual three-fold division which the textbooks adopt in their account of the technicalities,—the account given of terms, of propositions, and of arguments. The form of a word, or of an assertion, or of an argument, is too easily accepted as determining its 'logical character.'

Formal Logic, as Dr. Keynes openly says,[2] 'has

[1] Three of these were mentioned in Chapter I. :—

(1) That the 'logical character' of a word, or of an assertion, belongs to it quite independently of its context;
(2) That sentence and assertion are the same thing;
(3) That the reasoning process is distinct from its subject-matter.

[2] *Formal Logic*, 3rd ed. p. 3. Among the passages where this principle is departed from, I note the following in his first chapter:—At p. 7 Dr.

no cognisance' of context, and though in a few instances his book does take cognisance of it, yet it clearly does so against its own express intention and to a very limited extent. This neglect of context is chiefly, though not exclusively, shown in the distinctions drawn among kinds of 'terms' or names. The more expressly formal any Logic is, the more openly is the assumption made that, when a list of names or of sentences is given, the student can learn how to take any one of them and, by mere inspection of it as it stands, in isolation from any context, point out its logical character. You are supposed to be able to say, by looking at a list of words, which of them are 'general names,' 'proper names,' 'abstract names,' and so on; or by looking at a list of propositions, which of them are (*e.g.*) categorical or hypothetical. You are taught, either expressly or by implication, that the logical character of a word or sentence remains the same throughout all changes of context; that, just as when words are combined into a sentence their outward form undergoes no change, so with their inner attributes, or 'logical character.' Scarcely a hint is given that these technical distinctions are as loose and shifting as those which are made in Grammar between (*e.g.*) the substantive, the adjective, and the verb. As we all know, words which

Keynes admits that "it is in their character as terms that names are of importance to the logician, and it will be found that we cannot in general fully determine the logical characteristics of a given name without explicit reference to its employment as a term." At p. 9 he finds that names like *God*, *Universe*, and *Space* are 'general' or 'singular' according to the way in which they are used. At p. 12 he finds exactly the same fault that we should find with the distinction between 'collective' and 'general' names, pointing out that the correct and really important logical antithesis is between the collective and the distributive *use* of names. Some minor examples are noted below at pp. 254 and 268, and of course, as we saw at p. 144, context must often be considered in getting sentences into logical form. See also p. 261.

have been substantives are frequently taken and used as adjectives or verbs, and adjectives or verbs are in the same way turned into substantives. Sometimes these changes are only temporary, and sound odd and fantastic; but often they remain, so that even from the grammatical point of view—where average educated custom is the only thing considered—the same word belongs to two different classes, and we cannot say which it is when considered apart from context. Such words as *conservative* and *liberal* are familiar instances in point.

At first it may seem strange that precisely the same kind of uncertainty attaches to the much-discussed and carefully-defined distinctions of Formal Logic. One is naturally inclined to expect a better result from all the trouble that has been taken with these for so many centuries, and to imagine that any looseness must be merely accidental and cannot spring from the very roots of the system. One asks why need the distinctions be so faulty; why should not some simple mark or set of marks be mentioned which would serve to discriminate one kind of name from another, just as we discriminate kinds of material objects? We can explain the difference between a horse and all other existing animals, or between gold and all other known metals, in such a way that when even a moderate amount of care is taken we can be almost sure of applying these distinctions correctly. Why cannot the same be done with the different kinds of name?

The reasons are chiefly two. In the first place, words are instruments—instruments of assertion—and both their logical and their grammatical characteristics depend upon the function they per-

form in asserting. In the second place custom in the use of words is so elastic that there is little or nothing to prevent our using any word indifferently for either of two opposite logical or grammatical purposes,—just as a penny stamp may be used either for postage or for receipting a bill. There is nothing to prevent our taking (*e.g.*) a 'general' name and using it as 'proper,' and *vice versâ*; for example the proper name Smith[1] and the verb to jerrymander; nothing, that is, except an essentially variable custom with entirely undefined limits of authority. And this fact, partly perhaps because it is troublesome, Formal Logic proposes and tries to ignore. It follows the grammarians' habit of being content to think of the average purpose—*i.e.* the average context—of a given word, and to class the word accordingly, disregarding the particular occasion of its use, especially if it happens to be exceptional. Formal Logic systematically tries to forget the fact that it is always particular occasions that we have to do with when any doubt as to the logical character of a particular word has arisen. The average logical character of a word tells us at most what its actual logical character *probably* is,—tells us what it looks, on its face, as if it ought to be; but when doubt has arisen we need to go beyond this first superficial answer, and to raise the further question whether it is true of the particular case. No scientific account of the use of words can be given until we recognise clearly that words are, after all, used on particular occasions, not on general ones; that, strictly speaking, any word may be used for

[1] In fact, most proper names are derived from class-names just in the way that nicknames are.

either of two opposite logical purposes; and that normally most words may be so used without even committing any grammatical solecism. Thus the logical character of a name is not something fixed and stable, but quite the reverse. It is function, not structure, that determines logical character, and the function of words in asserting is variable. The different actual uses of names are what Logic needs to distinguish, not different sorts of name apart from their actual use; words in their context, not words as Grammar conceives them or as they lie side by side in a dictionary. The latter distinctions can only be of service to Logic so far as they help us to recognise the former. Some superficial help of this kind they do give, but it breaks down precisely in those cases where doubt has arisen, those cases where Logic begins to be required to correct the errors of unaided common sense. Since words are adaptable instruments of assertion, and are not restricted to a single function, we might as well ask whether a penny stamp, in the pocket, is a receipt stamp or a postage stamp, as ask whether a word, apart from its particular use, has this or that logical character.

The technical distinctions among kinds of name, as commonly conceived in Logic, are loose in the same way as those of Grammar, and from the same causes; but there the resemblance ends. The consequences of the defect are altogether different in the two cases. Loose distinctions can do very little harm in Grammar, since it cannot matter much whether we class a given word as (*e.g.*) a 'substantive' or not; nothing very important turns on the decision. And besides, Grammar does not put forward a claim to do anything more than strike an

average among essentially shifting and local customs. Logic, on the other hand, cannot avoid making a claim to go deeper than mere custom and country, even when it tries to be as modest as possible. There is no reason for its existence, as apart from Grammar and common sense, if it gives up all attempt to make technical generalisations which can be trusted. On their face they are statements about class peculiarities. Such-and-such a kind of name, or of proposition, is asserted to have this or that logical character, in contrast with other kinds; so that, given any specimen of the class, you can infer something about its nature. For it is only in order that we shall be able thus to use the generalisations that there can be any reason for making them; and, as we have seen, they could have no meaning if they were never intended to be applied. In ordinary talk, and in the freer kinds of writing, vagueness of statement matters little, because we all learn to make allowance for it; indeed we should get nothing said or written if we were for ever perplexing ourselves with the problems of strict definition. But just where the pretence of accuracy begins this easy-going behaviour loses its justification; and even the most elementary Logic is inclined to pretend to be accurate. So far as the technical distinctions of Logic are rough, therefore, the defect is serious. We shall presently see some of the confusion into which it inevitably leads.

§ 53.—Connotation and Connotative Names

Most of the logical importance which belongs to the traditional distinctions among kinds of name

arises through their reference to the distinction between 'connotative' names and others. For on this latter distinction depends our interpretation of the doctrine that all connotative names, and only connotative names, are liable to ambiguity. In order to interpret this with any precision we have to know which names are connotative and which are not, and the textbooks accordingly take some trouble with such questions as whether 'general,' 'proper,' and 'abstract' names are or are not connotative. But their trouble is largely wasted. Part of the confusion and contradiction shown in the answers to these questions is caused by the attempt to regard names in isolation from their context, and part by some uncertainty as to what is to be meant by 'connotation.'

It is not difficult to see that the only sense in which the word 'connotative' has any value is when it is taken to mean simply *descriptive*. According to this usage—which was J. S. Mill's,[1] and is now generally adopted—a name has connotation when such name is recognised as only conditionally applicable in concrete cases; that is to say, as only applicable to anything when and while the thing so named is of such-and-such a nature,—has such-and-such attributes or qualities; and the connotation of a name is the complete list of the attributes which anything must have in order to deserve the name.

[1] No doubt Mill was not completely consistent in this; consistency was never his strongest point. But the purpose of his distinction between connotative names and others (as clearly shown, *e.g.* in book i. chap. ii. § 5) was to put into two separate classes names which do and names which do not admit of *definition*. This fact has been overlooked by those who, like Jevons (*Elementary Lessons*, v.) or Mr. Bradley (*Principles of Logic*, book i. chap. vi. § 3), imagine that by 'connotation' must be meant implication generally, and not implication through the definition. See also below, pp. 247, 248, 257.

In the most useless sense of the term, the 'connotation' of a name is the mental picture, or group (or succession) of mental pictures, that happens to occur to the mind of the person hearing the name, or to the person using it, or to both together. A kind of excuse for supposing Mill to have meant this may perhaps be found in some of his expressions, but the confusion seems to be chiefly due to the fact that a name which has connotation (in the useful sense), and which therefore, when applied as a predicate, implies the attributes connoted, does also suggest corresponding mental pictures,—does 'excite ideas,' as it is sometimes called. Such excuses, however, do not amount to a justification. It is strange that any logician could overlook the total uselessness of the term 'connotation' when taken in this latter sense, owing to the fact that *all* names, as such, excite ideas. There would thus be nothing to contrast with connotative names. We should be laboriously drawing a distinction between names which perform their function (however misleadingly), and those which are devoid of all meaning or use; between names which are really names and those which are only noises. In nonsense-books for children a few such names occur, but as a class they cannot be said to have importance for Logic. The mistakes against which Logic has to help us are never caused by the employment of words which entirely fail to excite ideas; in the suggestion of false ideas, not in the absence of all suggested ideas, lie the real dangers of language.

Confusion between these two explanations of the word 'connotative' produces, as such confusion must, a crop of perplexities and contradictions. Consider,

for instance, Jevons' treatment of the question whether proper names are connotative. He quotes[1] Mill's statement that they are not so, and fails altogether to see that Mill is there merely defining the sense in which he is going to use the word connotative, not declaring an opinion on a question of fact. Jevons speaks of Mill's view as "probably erroneous," and goes on to argue (as if any one had denied it) that proper names have a way of reminding us of the facts we happen to know about their owners; and finally adds, "This, however, is quite an undecided question; and as Mr. Mill is generally considered the best authority upon the subject, it may be well for the reader provisionally to accept his opinion." Would it not be still better for the reader that he should try to understand Mill's statement[2]—which is not a statement of opinion, but a postulate—rather than try to accept, as on Mill's authority, a view not held by Mill, and for which the epithet "probably erroneous" would be far too lenient? There can be no doubt that Mill, like every one else, would never have wished to deny that proper names raise mental pictures. So far as proper names admit of being clearly distinguished from general names,[3] the answer to the question whether proper names are connotative depends entirely on the prior question whether we prefer the useful or the useless sense of the term. If the only connotative names are descriptive names, then proper names (when used as such) are not connotative; on the other hand, if to connote is to excite

[1] *Elementary Lessons*, v.

[2] See note, p. 245 above. Proper names, Mill says, "are not dependent on the continuance of any attribute in the object," and they are *therefore* classed by him as non-connotative. That is the way he defines the meaning and purpose of the distinction as drawn and used by himself.

[3] The nature of this distinction is discussed in next section.

ideas, then proper names, like all others, are connotative, and the whole value and meaning of the distinction is lost.

Other writers[1] again, while intending to take the word 'connotative' in the sense in which Mill expressly claimed to use it, have occasionally failed to distinguish between connotation as a group of qualities possessed by certain things, and connotation as a list of conditions under which a class-name is supposed to be applicable to any particular thing,—failed to see that connotation (in the useful sense) is something that belongs to the class-name and not to the things named. Confusion on this point often arises through the fact that a name "connotes attributes" in the thing named; whence it is natural to think of the attributes as "forming the connotation of the name." Such a phrase may of course be used if we remember that it is not, strictly speaking, the attributes, but the name's relation to the attributes, which constitutes the connotation. To think of the connotation as the list of conditions under which the name is supposed to be applicable will at any rate guard us against wasting time over certain confused questions which may otherwise arise, —for instance the question whether "the connotation" means all or only some of the properties possessed in common by members of the class. The extent of a class depends on the definition of the class-name, not the definition on the accepted extent of the class. Otherwise there could be no rearrangement of class-names, no problems of interpretative definition, and so the growth of knowledge would come to an end.

[1] *E.g.* Mr. E. C. Benecke, in *Mind*, vol. vi. p. 532. And Mill himself was not entirely free from the confusion here noted; see, for instance, p. 257 below.

Perhaps the simplest way of avoiding confusion would be to avoid the word 'connotative,' substituting 'descriptive' for it. Instead of the connotation of a name we may in the same manner speak of its *definition*. To define any name, whether for general purposes or with regard to a particular assertion, is to give its connotation; that is to say, to specify not the qualities or attributes possessed by those things which happen to bear the name, nor those which the average man may think of when he hears the name, but those which anything must possess in order to deserve the name,—the list of conditions under which the class-name is applicable in concrete cases.

§ 54.—The General Name

With the general name, or class-name, we have already made acquaintance, and have discussed its nature at some length in Part II. But the account which the textbooks give of it differs from ours considerably. In the first place they do not sufficiently recognise the difference between the two opposite aspects under which the general name may be regarded. A name may be considered to get its generality either from the fact of its naming a *genus* or class; or on the other hand from the difference between its function and that of the proper name,—from the descriptive manner in which it names the individuals that come under it, in contrast with the colourless way in which a proper name (when actually proper is used. The textbooks, though wavering somewhat between these two meanings, incline rather to the former as giving the better explanation. Etymologically, no doubt, it is all that could be

desired, but on other grounds its value is more doubtful. What Logic wants to know about a given name is not whether it applies to one thing or to more than one, but whether it applies conditionally or unconditionally to whatever it may denote,—whether it has 'connotation' or not. It is only so far as the general name coincides with the connotative name that the distinction between general names and others has logical importance; and the coincidence is imperfect, and therefore untrustworthy, until the assertion in which the name occurs is also taken into account. It is merely a loose grammatical truth that general names are connotative; any name, general or not, is connotative when, and only when, it is used either as a predicate or as one of the terms of a general assertion, and thus becomes the middle term of a syllogism. And the effect of ignoring the relation between the connotativeness of a name and the particular use to which that name is put in an assertion is to obscure the whole question as to the right of demanding a definition. Formal Logic thus plays into the hands of the quibbler who raises an irrelevant demand for a definition, as well as of the quibbler who seeks to evade the demand when it is relevant.

And in the next place there is another way in which the usual account is unsatisfactory. The general name, we are told, is a name which is "capable of being correctly affirmed, in the same sense, of each of an indefinite number of things, real or imaginary." Then either all names are general names or there is some class of names that are not capable of this usage. Which, then, are these? Obviously there is a class—viz. proper names—which are only seldom

applied in this way, but still they are perfectly *capable* of it, as the substantive 'boycott' proves, not to mention more ancient examples. And there is another class—viz. singular names—supposed to be constituted by the absence of this capability; but when we come to inquire which they are we find they include on the one hand proper names, and on the other hand names which, though they apply only to a single case, are nevertheless descriptive. Thus the general name, when considered apart from its context, has no other kind clearly contrasted with it. It is sometimes contrasted with the singular name and sometimes with the proper name, and only the latter contrast has importance for Logic. There is, for example, no *logical* interest in the fact that the name 'God' is singular to a monotheist and general to a polytheist,—no logical interest, that is, in regard to distinctions among kinds of name, however useful it may be as a mere example of a common way in which words get different meanings.[1] And what logical purpose can there be in separating, as Jevons did,[2] names of substances, such as gold or water, into a class by themselves under the title 'substantial terms,' since they are just as descriptive as any general name can be? Owing to this undecided way of conceiving the kind contrasted with general names, the question whether general names as such are connotative cannot be answered by Formal Logic except in a way that obscures the connection between connotativeness and the risk of ambiguity. We shall also see (§ 56) how it confuses some of the questions about the use of abstract names.

[1] Keynes' *Formal Logic*, p. 9.

[2] Not always, but in the *Principles of Science*, vol. i. p. 34. And Bain (*Deductive Logic*, p. 48) makes these into singular names.

§ 55.—Denotation

In our first chapter (p. 42) it was noticed that to speak of 'the meaning' of a word—even when we refer only to its definition (connotation) is at times ambiguous. A given word may admit of as many different definitions as there are different reasons why we may want the word defined; we may be asking how it is commonly used, or how it ought to be used; and the common usage of one sect or locality is not always that of another, while more than one standard of 'correct' usage may easily be suggested, —grammatical, technical, etymological, as well as the meaning intended in some particular assertion. But even when all confusion due to this source is avoided, the question as to 'the meaning' of a word is still an ambiguous question in the case of general names, for both the connotation and the denotation of a general name may with equal right be called its meaning; both its general definition and the list of particular cases to which it is applicable or applied. In speaking of general names, therefore, we occasionally need words to mark the two sorts of meaning, connotative and denotative, and the corresponding substantives, connotation and denotation; but we do not need the term denotation for any other purpose. It is quite unnecessary, for instance, ever to speak of the denotation of a non-connotative name,—the word 'meaning' is all that is needed there, since such names have only the one kind of meaning.

§ 56.—The Abstract Name

The abstract name, as conceived by Formal Logic, is in an even worse case than the general name. The perplexity of the textbooks as to whether abstract names are general or singular, and whether they are connotative or not, is a standing reproach to the present teaching system. And this perplexity is in great part due to the habit, noticed above (§ 54), of defining the general name as a name which applies to members of a *genus* or class—*i.e.* to plural things—a definition which tends to introduce confusion by encouraging us to think of abstract names as other than general, and as having either no connotation or connotation in some other sense than 'definition.'

The technicality 'abstract name' is borrowed ready-made from Grammar, and is there translated 'the name of an attribute,' as contrasted with the name of a *thing*. The distinction between attributes and things is, however, much too vague to bear any pressure. The deepest philosophy is unable to say what is a 'thing' as contrasted with 'an attribute of a thing.' Certain names indeed there are which are perhaps never now regarded as other than names of attributes, and they may be generally known (in English) by being formed from adjectives by altering the termination in a few well-known ways; *e.g.* true, truth; young, youth; excellent, excellence; hot, heat; cool, coolness; adverse, adversity; and so on. Names of this kind are what Grammar would call abstract, but there is no reason why Logic should make a distinction between them and the adjectives to which they correspond. It follows from what we saw in Part II. about the nature of general

names, that all of them suffer from abstractness (*i.e.* vagueness), however concrete be the things they denote. Indeed, the extent to which they suffer from it is wholly independent of the question whether the things denoted are concrete or not. If an adjective, such as 'excellent,' is indefinite because all the things belonging to the class must differ somewhat from each other, it cannot become any more so by a mere change in its termination or in its grammatical character.

The only escape from this confusion appears to be to make the distinction between abstract and concrete refer to propositions, not to names without special context. It is interesting to notice how narrowly some writers have missed seeing that it is primarily a distinction among propositions (*i.e.* among names in a context, or names as used). Prof. Bain, for instance, illustrates his remarks about 'abstract names' by means of propositions in which abstract names are used as terms, and in one passage speaks of these as 'abstract propositions.'[1] Even more instructive is it to find so formal a logician as Dr. Keynes[2] approaching our view from another side. He sees, more clearly than Mill and Bain, the unsatisfactoriness of the old definition "a concrete name is the name of a thing, while an abstract name is the name of an attribute"; he sees that the distinction cannot be regarded as having much logical value except where it is made purely relative and shifting, —which involves taking context into account. When we find this view put forward in a book which attempts to "take no cognisance" of context, it encourages us to hope that the distinction will soon

[1] *Logic* (*Deduction*), p. 53. [2] *Formal Logic*, pp. 14-16.

come to be widely recognised as applying (like that between collective and general names, noticed above[1]) to names as used in propositions, not to names culled from a dictionary and set by themselves. It is the assertion, rather than the name,—it is only the name because used to express the assertion,—which properly deserves to be called abstract or concrete.

Our view of the matter goes further than this, however. We shall have occasion in the next chapter to notice that it is not possible (except as a mere guess) to look at an isolated sentence and declare that the assertion it makes is abstract (or 'essential'). Whatever be the words in which the assertion is expressed, it is not a purely abstract assertion if it is intended to have concrete application, or to face the chance of being contradicted in the concrete. Here lies our difference from the view taken by Prof. Bain, who appears to have hardly quite broken with the belief that the abstract name makes the proposition abstract, in spite of his seeing that abstract propositions have a concrete meaning if they have any meaning at all.

When the logical character of names is made to depend upon their function in asserting,—their actual and not merely their usual or average function—the different sorts of name become merely different linguistic devices of expression. We sometimes want, for instance, to express a general assertion, sometimes to predicate about a Subject. And for both these purposes the class-name is a handy device. But that does not prevent our taking a name which is commonly used for these purposes and using it merely to refer to S non-connotatively—which is the

[1] Page 240 *note*.

normal function of the proper name. We do this, for instance, whenever we use as Subject term a nickname which we think ill-chosen; and specially when our purpose is to say that 'A' is not A. Similarly the abstract name is a linguistic device, and its purpose is that of expressing concisely a general assertion which would otherwise have a clumsier form.

We found above[1] that there are both legitimate and illegitimate abstract assertions, the former being those in which the abstract name (if this verbal device happens to be used at all) is admitted to have *some* denotation,—to refer to some concrete cases,—and the latter being those in which an attempt is made to lift the assertion above all danger of being disproved by a contradictory instance. To say that an abstract name—*e.g.* the name 'deceit'—*denotes an attribute* is merely a way of evading the question whether it has denotation or not, in the only sense in which denotation is an important thing to possess. A better explanation would be that an abstract name, when used with any meaning (and so with any kind either of denotation or connotation) is a general name whose denotation and connotation are noticeably doubtful; its denotation being the concrete cases by which the truth of the assertion is to be tested, and its connotation being the definition which covers these concrete cases.

Nothing will be gained by imagining that the nature of the abstract name is to be easily understood, but at least we may avoid in this way getting into a perfectly hopeless tangle. Such a result is inevitable if we are content with a grammatical account of the kinds of name, and with the doctrine that con-

[1] Pages 31, 219-221.

crete names denote things or concrete cases, while abstract names denote abstractions (attributes). Grammatically speaking, a general name is a name which denotes the members of a class, in opposition to a singular name, which denotes an individual thing or case. Now an attribute, considered as something denoted, and therefore as some kind of entity,[1] can hardly be identified with the group of concrete cases in which the attribute occurs; and since, in order to deserve a single name at all, it must be regarded as the same attribute in all these cases, we should be driven to call it singular. But if the abstract name is singular, what has become of the generality which inevitably belongs to any abstract assertion?

This, however, is only one of the contradictions into which the grammatical account of the abstract name is sure to lead us if we attempt to take it strictly. Suppose we try to answer the question whether 'abstract names' are connotative. Since to connote is to connote attributes, and an abstract name is said to denote an attribute, what, it may be asked, is there left for an abstract name to connote? The answer suggested by J. S. Mill is that as a rule it connotes nothing, but that there are 'some cases' where an attribute may be said to have attributes, and that the abstract name occasionally is in this way connotative; for example, the attribute *slowness* in a horse may have the attribute *undesirability*. But here he evidently falls into the confusion noticed at p. 248 above, departing from his own account of the nature of connotation. And if this is the only

[1] An abstract name as the name of 'something' and yet not the name of any 'thing' forces us to use the barbarous word 'entity'; but that is a small matter compared to the other difficulties.

way in which an abstract name can be connotative, what are we to make of his statement a little further on,[1] that "it is impossible to imagine any proposition expressed in abstract terms which cannot be transformed into a precisely equivalent proposition in which the terms are concrete." He instances the translation of 'Thoughtlessness is dangerous' into 'Thoughtless actions are dangerous.' If 'thoughtless actions' is a connotative name, and 'thoughtlessness' is its precise equivalent, there is evidently some confusion in holding that 'thoughtlessness' is a non-connotative name.

And of course if we are also in doubt whether we mean by a general name the opposite of a singular name or the opposite of a proper name, and whether we mean by the 'connotation' of a word its definition, or the ideas excited by it, or all the qualities possessed by members of the class, we may complicate the above contradictions still further. Until the logical character of names is seen to depend on the uses they are put to in this or that assertion, no sense can be made of this elementary part of Logic, or of any other parts that depend upon it; the separate statements about the kinds of name will not fit together, and the whole of our Logic will rest on a false foundation.

[1] Vol. i. p. 119.

CHAPTER X

KINDS OF ASSERTION

§ 57.—'Logical Form'

In the account that is usually given of the kinds of assertion, the excessive attention of Formal Logic to form as a guide to meaning is easily seen. Here also little or no account is taken of context, but each assertion is regarded as standing by itself, and the logical character of assertions is assumed to be uninfluenced by the purpose for which they are used in particular pieces of reasoning; a view which is greatly helped by the confusion between assertion and sentence. At the same time our natural tendency to the latter confusion is also necessarily increased by the systematic attempt to take 'propositions' independently of their context; for the more we are led to look for the logical character of the proposition within the limits of the proposition itself, the more we are restricted to the mere form of the sentence as decisive.

It is true, no doubt, that Formal Logic would never deny that sentences as we meet with them in ordinary conversation or in books often need some manipulation before we get them into the so-called

'logical form.'[1] But merely to refrain from denying this obvious fact is too negative a virtue. By making light of the real difficulties of translating sentences into the required form, and in other indirect ways to be noticed presently, Formal Logic greatly encourages the view that the logical character of assertions depends on the form of the sentence in which they happen to be expressed.

In the first place, in the account that is usually given of predication the student is not sufficiently warned of the difficulty of deciding which (if any) word or words in a given sentence is the Subject term and which the predicate.[2] The fact is not sufficiently impressed upon him that the order of words in a sentence is variable, and that the same meaning can usually be expressed in several different ways. Of course it is true that *after* a sentence has been put into logical form the S and P can be distinguished by their order; but that is only to say that after they have been already distinguished and arranged in this order, such is the order in which they are arranged. For instance you put the sentence 'Great is Diana' into logical form only after you have recognised that 'great,' in spite of standing first, is a description given of Diana, not 'Diana' a descrip-

[1] As we noticed above (p. 144), there is no foundation for the claim that any form of sentence is more 'logical' than others, except the traditional custom of formal logicians.

[2] See, for example, Jevons' *Elementary Lessons*, viii. There the Subject is flatly identified with "the first term of a proposition" and the Predicate with "the second term"; the proposition itself is identified with the "sentence indicative"; and scarcely anything is said about the need of reducing to logical form. In a later passage, 22 pages further on, this subject is treated, but only so as to leave the student under the impression that with a little care any one may analyse any sentence *correctly* into S, copula, and P by mere inspection of its words. It should be noted also that some of the logicians who insist on quantifying the predicate would go so far as to express 'Great is Diana' as 'Some great is all Diana,' and to call 'great' the Subject. A reference is given by Dr. Keynes (*Formal Logic*, p. 71).

tion given of 'great.' And the same holds good where a single word is used to convey an assertion, or where the sentence is in any other form than that which claims the name of logical. Such sentences can always be reduced to the required form, but in order to reduce them we have first to decide—on some other ground than the order of the words—what is the Subject and what is the Predicate. And as we saw above (pp. 11 and 144), even the most formal logician must occasionally take context into account if he is to decide this with any approach to correctness.

We noticed in § 30 some cases where the analysis into S and P cannot be performed without help from the context. The same difficulty occurs also in assertions which give two names for the same thing, —as 'Tully is Cicero,' or '*Hund* is Dog.' Although the form of such sentences is often exactly that of 'S is P,' yet it is highly doubtful whether they can be intended as a description of S; on their face they mean either that the two names A and B are applicable to the same individual, or that the two words A and B are synonymous; only the context, and that uncertainly, can tell us which of the terms is intended as Subject. Or again there are cases where excessive attention to the form of the sentence must obscure the meaning of the assertion. Take such a sentence as 'Rain is likely.' Presumably, 'Rain' is not the Subject, but is part of the predicate, of the assertion which this sentence is intended to make; almost its only conceivable intention is, not to describe rain in general as 'likely' (or even 'likely to come'), but to describe that indefinite Subject which we sometimes call 'It' (and by which we here mean

the weather in our own neighbourhood) as threatening rain.

Such cases, and especially where no Subject term is expressed, should be brought prominently forward instead of being lightly passed over. Besides their value in keeping us from confusing assertion with sentence, they may also help us to see an insufficiently recognised fact about the nature of any predicative statement,—namely that the predicative term is the only part of it which can suffer from ambiguity. It does not matter how vague our idea of the Subject may be, so long as we know what is referred to,—since the very purpose of predication is to add certain descriptive characters to something not yet known to possess them, and so to remove some of the vagueness which is *assumed* to exist. As Dr. Stout well says,[1] "The subject is, so to speak, the formulation of the question; the predicate is the answer." Thus all predication necessarily assumes two things about the Subject: (1) that the audience already have at least some vague idea of that which is to be described; and (2) that they have *not* already so complete an idea of it as the predication attempts to give them. In every predication, the Subject is necessarily taken at least as having some known characters, and at most as being incompletely characterised before the predication is made. A description of something wholly unknown, and a description of something completely known, would alike be meaningless.

[1] *Analytical Psychology*, vol. ii. p. 214.

§ 58.—Universal, Singular, Particular; Affirmative and Negative

From the point of view of any Logic which is able to recognise that the same assertion may be expressed in different forms of sentence, the A E I O distinctions are highly unsatisfactory. They openly turn on the form of the sentence, and therefore correspond only by accident to differences of assertion. It should be noted, however, that the contrast between universal and particular may have been, at least partly, suggested by a really important difference,—namely that between a generalisation asserted and a generalisation denied. 'All S are P' or 'No S are P' are forms often used for asserting a generalisation, while 'Some S are not P' or 'Some S are P' are corresponding forms often used for denying a generalisation. But even when the distinction is so understood the names are badly chosen, since the last thing the 'particular' does is to particularise; the salient feature of it—*i.e.* of the answer 'No' to the question 'Is it true that all (or no) S are P'—is cautious vagueness. And as for the universal, since it is made to include indifferently assertions about a class and assertions about a particular case ('singular' propositions), this name helps to increase the difficulty which, as will appear in § 60, attaches to the question whether general propositions are predicative or not. Moreover, if singular propositions, affirmed or denied, are to be classed along with general propositions affirmed, the excuse just mentioned for the division into universal and particular loses its value.

For the contrast between affirmative and negative propositions, as the traditional Logic conceives it, the

excuses that are made are strangely weak; at least any that I have met with are quite irrelevant to the objections here brought against it. These objections are not against all possible distinctions between affirmative and negative propositions, but against making the distinction depend upon the *copula* which happens to be used in the sentence. Mill's remarks[1] on this point, therefore, are beside the issue; no one denies that there is a difference between affirmation and denial; no one has the smallest desire to obliterate or obscure that distinction, or to throw a shadow of doubt upon its reality. The questions raised are: (1) *which* propositions shall be called affirmative, and which negative? and (2) what are the respective advantages and disadvantages of putting the negation into the predicate term instead of into the copula?

As to the former question, the choice lies between making the distinction turn upon the form of sentence and making it turn upon the meaning of the assertion; and we contend that the latter course is preferable. The admitted fact that to every proposition there corresponds an 'obverse' which is equivalent to it in meaning, shows conclusively that the distinction as drawn in the traditional Logic is not a distinction of meaning, but of mere external form. Clearly, therefore, the claim that there is a useful distinction of *meaning* between affirmative and negative propositions—a claim which no one would dispute—is in itself no argument in favour of the traditional way of drawing the distinction. The real interest, for Logic, centres in the reasons for making the

[1] *Logic*, vol. i. p. 88. The same applies, I think, to the arguments of Dr. Venn (*Empirical Logic*, pp. 214-216) and of Mr. Carveth Read (*Logic, Deductive and Inductive*, p. 49).

decision in one way rather than another, not in the verbal forms which may be used to express it when made; and the effect of neglecting or subordinating this inquiry is to lead the student to suppose the decision an easy matter, and so to give undue weight to the grammatical accidents of verbal expression in the sentence. Why should the sentence 'No men are infallible' be called a negative proposition, when the *equivalent* sentence 'All men are fallible' is called affirmative? This is what Formal Logic is asked to justify.

As to the question whether the sentence denying that S is M should be written 'S is not M,' or 'S is not-M,' our contention is that as regards logical theory it matters not how it is written, so long as we recognise that the latter way of writing it does not make the assertion affirmative. But as regards the exposition of syllogistic forms, there is a reason for preferring the negative predicate to the negative copula; it relieves the Syllogism of some of its needless complications. The admission that *Celarent* and *Ferio* are only *Barbara* and *Darii* in a verbal disguise does not in the smallest degree interfere with the admission that some propositions are affirmative and others negative; it merely reduces by half the number of separate syllogistic forms which need be considered. Thus we do not dispute (what Lotze says[1]) that every syllogistic conclusion which could be drawn from the premiss 'S is not-M' could also be drawn from 'S is not M,' but we merely recognise that the converse equally holds true.

The chief reason why so many writers cling to the old formal distinction, which thus confuses the nega-

[1] *Logik*, § 40.

tive sentence with the negative assertion, is suggested by Lewis Carroll,[1] and seems probable enough—a dislike of negative terms. We need not, indeed, call it (as he does) either a morbid dread or an unreasoning terror, but we may as well admit that the reasons against putting the negation into the predicate, and so being prepared to form negative terms without limit, are either—as with Lotze—due to the superstition that every predicate term must be an independent *concept*, or else are merely grammatical or literary—such as that the substantive 'unpatriot' is not to be found in the dictionary, or has a clumsy appearance, or that the word 'non-conformist' has happened to acquire in common use a special restricted sense. When a speaker chooses to override a local custom of not using a certain negative term, or of using it in too narrow a sense, the negative copula disappears. And it is of course only distinctions of copula which give the copula any claim to attention; when these are removed the copula is, as Mill very nearly[2] recognised, a mere verbal sign that a predication is made.

The question how to distinguish between affirmative and negative assertions (as contrasted with sentences) presents some difficulty. All would agree that the abstract distinction has in view a relative difference in definiteness of assertion, or risk taken by the assertor; the negative assertion is easier, vaguer, and less risky, than the corresponding affirmative; whatever other differences may be included in the distinction, that at least is the logical value of it, the reason for drawing it at all. But the question is

[1] *Symbolic Logic*, p. 171.

[2] Expressly, he did recognise this (*Logic*, i. iv. § 1), but his criticism of Hobbes, in § 2, seems scarcely consistent with such recognition.

how to apply the distinction. Evidently if it is made to turn simply on whether the assertion gives the answer yes or the answer no, then every assertion would be affirmative and negative at once.[1] For every assertion answers 'yes' to one of a pair of contradictory questions, and 'no' to the other. A better way appears to be to regard it as a distinction among kinds of *question*, rather than kinds of answer. Of every pair of contradictory questions there is usually one which, being vaguer than the other, admits of the answer 'yes' on easier terms; assent to it may be satisfactorily given on a less extensive review of the facts. We can usually see, for instance, that a given rule admits of 'some' exceptions, more easily than we can see the whole range of exceptions which ought to be recognised. Or we can usually see that S is not P more easily than we can see exactly what kind of not-P it is. Such assertions—for question and answer together make an assertion—are those which the name 'negative propositions' may have always had vaguely in view, though, owing to the old confusion between sentence and assertion, and to the consequent insistence on a negative copula, this account of the difference is far from having been always clearly accepted.

There would be some difficulty, no doubt, in finding suitable names by which to distinguish the two kinds of question. We can hardly call a question either affirmative or negative, since in a question as such there is neither affirmation nor negation involved. Nor would it quite do to call the one kind definite and the other vague, since (1) it is only relative

[1] This is admitted even by so formal a logician as De Morgan (*Formal Logic*, p. 40).

definiteness which is required, and (2) it is only in the case of pairs of questions related in a special way that this quality makes the difference; the questions must be about the same S, and the suggested predicates must be contradictory terms.

However, the name matters little. The point to notice is that where the opposite questions are general, or refer to a class by its class-name used 'distributively,' our distinction between affirmative and negative assertions corresponds exactly to the old distinction between a universal and a particular of opposite quality (between A and O, or between E and I), with the difference, however, that the form of sentence used does not itself determine the meaning, but is only one indication of it among others. There are recognised ironical expressions, for instance, where the apparently vague word 'some' may make a very definite reference, and there are recognised overstatements where the word 'all' is evidently not intended to be taken literally.

When, on the other hand, the opposite questions are not general, but refer to some particular case—*e.g.* where a proper name is used for the subject, or a class-name taken 'collectively'—the negative assertion may always be regarded as making use of a negative predicate term. This seems indeed to be the only excuse for drawing a distinction between positive and negative terms—a distinction which Formal Logic preserves, while admitting[1] that from its own point of view "it is a matter of indifference whether any given term is materially positive or negative." From the purely formal point of view it seems that no better account of the distinction can be

[1] *E.g.* Keynes' *Formal Logic*, p. 52.

given than that it turns on the question whether the name, taken apart from its context, has a 'negative prefix,' in which case words like *unorthodox*, *immediate*, or *non-juror* would have to be accounted negative, while pairs of terms like *British* and *Foreign* would appear each as positive as the other.

§ 59.—Essential and Accidental Propositions[1]

There are signs that Formal Logic is becoming aware of the unsatisfactory nature of this distinction. Though Mill and Bain—especially the latter—seem to have thought it an easy matter to apply it confidently, more recent writers are beginning to recognise that we cannot take an isolated sentence and declare it to be distinctly of the one kind or the other.[2] In the exercises arranged for beginners, this assumption is still commonly met with, but it belongs to a view of the 'essence' of things which is steadily vanishing with the growth of the modern conception of classes. The question what qualities are essential to the class X is, as we have seen, a perfectly open question, except so far as we can agree to close it for the sake of making a meaning. Therefore we can never declare, in a downright or unconditional manner, that a given statement about a class X is essential; we can only do so by virtue of some previous agreement about the essence of a class, or, as

[1] The remarks here made apply equally to the contrast between *verbal* and *real* propositions, or *analytical* and *synthetical*, or *explicative* and *ampliative*. As Dr. Venn notices, "these all mean substantially the same thing, indicating at most trifling differences in the point of view from which the propositions are regarded."

[2] The disability is, however, seldom if ever clearly traced to its source in the unstable character of the 'essence' of class-names. Dr. Keynes, for instance (*Formal Logic*, p. 44), seems to regard it as merely due to the limited scope of professedly formal Logic.

it is now more usually called, its definition. Of course there are plenty of cases where this agreement, though tacit, may for most purposes be taken for granted. But, as we have noticed so often already, Logic cannot be content with loose talk about 'most purposes,' nor with doctrines and distinctions which are satisfactory only where there is no dispute. The fact that in all discussion we are constantly meeting the doubt whether the question at issue is a 'merely verbal' one or not, is a measure of the real difficulty which attaches to the distinction between essential and accidental propositions when we attempt to apply it. Just in those cases where common sense fails to avoid confusion, the traditional distinction is found incapable of giving help.

The meaning, or idea, of the distinction is of course clear enough; essential propositions are what we have here spoken of as 'purely abstract statements'—statements which are ingloriously safe from all attack, and which make no assertion, but at most lay down a postulate about the meaning of a word. That it would be an excellent thing if we could always prevent these from being taken for statements of fact is one of the chief contentions of this book; but to call it an easy matter to avoid the confusion would be far more uncomplimentary towards those who habitually fall into it—formal logicians, for instance—than I think we have any right to be. In § 6, and again in § 50, we had occasion to notice the part that may legitimately be played by abstract statements in preparing the way for an extension of knowledge—a circumstance that goes far to explain their radical defect when they are regarded not as guesses but as absolute truths.

Yet the fact remains that the traditional Logic enters into none of these problems, and so does nothing to make the distinction less obscure. As we saw in § 53, the remains of the old conception of classes, and the loose teaching about the nature of connotation, are chiefly responsible for the perplexities with which the textbooks attempt to deal, on such questions as whether all the attributes possessed by a class are connoted by the class-name,[1] or whether a proposition like "Homer wrote the *Iliad*" is essential or accidental. When the connotation of a word is seen to be neither more nor less than its definition, it follows that all the essential attributes, and no others, are connoted by the class-name. But since there may be an inquiry for the particular definition as well as for the general one, the accepted list of the essential attributes of any class is always liable to extension or contraction. And as to the statement that Homer wrote the *Iliad*, I do not see how the question whether it is essential or not can arise, so long as we regard it as a predication about an individual named Homer, since the names of individuals (when used as Subject) have no connotation in the only important sense of that term, and therefore only general assertions can be essential. Regarded as a predication about Homer, it is clear that *if* we assume its truth beforehand it does not express a judgment at all, but merely an assumption; or *if* the predicate does nothing to increase our knowledge of the subject, it is only a sham predication; under such an interpretation, and on the further condition that this 'if' holds true, then of course its defect is analogous to the defect of

[1] The confusions involved in this question are well analysed by Dr. Keynes (*Formal Logic*, pp. 21-25), who himself keeps clearly to Mill's sense of the term.

essential propositions at their worst. But other interpretations are also possible; it may be a predication about 'the author of the *Iliad*,' that he is 'named Homer'; or again, it may be a statement that the *name* Homer denotes the author (or authors) of the *Iliad*; and both these latter interpretations clearly allow the proposition to be accidental.

§ 60.—Categorical and Hypothetical Propositions

When the word 'hypothetical' is used in its widest sense[1]—to include all propositions other than categorical—and when categorical assertion is identified with predication, it follows that the problem how to distinguish between categorical and hypothetical propositions is the same as the problem how to *define* 'predication'—a word which we have up to this point been content to leave undefined. As a mere translation, 'description of a Subject' is sufficient, but the problem how to mark off predication from all other kinds of assertion, even those most nearly resembling it, is one of the standing difficulties of modern Logic, though in the traditional system it was overlooked or treated lightly. On the one hand we may be led to admit that all assertions are predicative, that assertion, as such, is categorical; on the other hand, we may see some reasons for trying to make a distinction between predicative and hypothetical assertions. If we choose the former alternative we shall meet with assertions which are not quite easily regarded as describing a Subject; if we

[1] Dr. Keynes gives a list of some other usages of the word, in a note at p. 59 of his *Formal Logic*. And in his eighth chapter he adopts a special sense noticed below in § 63.

choose the latter we shall meet with assertions which seem to belong to both the opposite kinds at once.

The contradictions shown in the account the textbooks usually give of this distinction are a further instance of the evil effects of confusing assertion with sentence and of seeking for logical character in the mere form of the words employed. The student is fortunate if his textbook does not lead him to think that a categorical assertion gets its categorical character by being expressed in the form 'S is P,' and that the hypothetical gets its character by beginning with the word 'if,' or some other grammatical device for expressing a condition. The distinction is always —tacitly at least—conceived by formal logicians as a distinction of form rather than of meaning or purpose. Thus they talk of the 'reducibility' of hypotheticals to categoricals—as if an alteration of form could alter the nature of the *assertion*; and they talk of the hypothetical as being two propositions joined together, thus assuming that it is perfectly easy to distinguish between a simple assertion and a compound or complex one. A little reflection shows that it is only when assertions are identified with sentences that the distinction between simple and compound assertions can be maintained; that is to say, the distinction is merely grammatical, of no value to Logic except so far as we can trust the half-truth that the sentence and the assertion are identical. How difficult it is for Formal Logic to recognise that two sentences joined together as antecedent and consequent clause can constitute a single proposition may be seen from a definition of the hypothetical that is still very often given: "A proposition is categorical if the assertion it makes is absolute or

downright, as in 'All men are mortal' or 'Some men are unwise'; it is hypothetical or conditional if made under a condition, as in 'Where ignorance is bliss, 'tis folly to be wise,' or 'If metals be heated they expand." When these hypotheticals are regarded as single assertions we see at once that it is only a *part* of each of them that is made under a condition. The assertions, each taken as a whole, are as absolute or downright as any other assertions are. What is true is that the hypothetical or conditional may always be divided into two propositions — two 'clauses,' the antecedent and the consequent—*one of which is asserted under condition of the other being true;* but that is a very different matter. It can hardly be seriously maintained that the hypothetical as a whole is the same as its own consequent clause.[1]

But even if we do our best to leave the mere form of the sentence out of account, and endeavour to make it a distinction of meaning, the conception of propositions as self-sufficient statements, quite independent of their context—or as having a meaning apart from the function they are used to perform in a piece of reasoning—is fatal to clearness. Admitting, as Formal Logic quite freely admits, that all assertions

[1] It is interesting to notice how nearly Mill escaped this confusion. He fell into it where he expressly defined the categorical proposition, but not in explaining the nature of the hypothetical. Half a page before, and half a page after, he defined (i. iv. 3) categorical propositions as those in which "the assertion" is not dependent on a condition; he admitted that in the hypothetical also something is asserted unconditionally.

It is quite safe to say, with Mr. Bosanquet (*Logic*, vol. i. 94, 95) that a categorical asserts an actual fact absolutely, while a hypothetical asserts only the consequence that follows on a supposition. But no such translation, we must remember, tells us whether the proposition 'all X are Y' is in a given case a categorical or a hypothetical. In propositions of this type, as Mr. Bosanquet notices, the line of demarcation is at once blurred. Indeed the value of the distinction cannot possibly be understood unless the context of propositions is taken into account in deciding their logical character, and we give up considering the mere form of sentence decisive.

may be expressed in the so-called categorical form 'S is P,' there are evidently distinctions of meaning among them which it may be important to notice, and which seem to suggest a purpose and value for the distinction between hypotheticals and categoricals. For instance, some are assertions of general rule, while some are assertions of particular fact; or again, some imply, while others do not imply, the existence of S.

The difficulty is that if we leave off making the mere form decisive, and yet do not make actual function decisive, we are left with nothing but average function as a guide in applying the distinction; and average function cannot be more than a rough unsatisfactory guide. It is true that the majority of assertions come before us not as parts of an expressed syllogism, but with an appearance of self-sufficiency, and we are left to imagine uses for them—to see them as potential major or minor premisses, ready for use, and only waiting to enter into combination when the occasion offers. It is natural that there should be a good deal of agreement as to the special use which most befits a given truth as it comes before us, or which is the most pressing or obvious use to make of it; and it is in this way, no doubt, that we draw convenient rough distinctions like that between assertions of general rule and assertions of particular fact. Their convenience leads us to forget their lack of clearness; because, for instance, we can usually recognise a statement of general rule when we meet with it, we forget that every general rule may also be regarded as a statement of particular fact, and indeed is often used as such, namely whenever it is made into a minor premiss.

Again, the difference between propositions (in the form 'S is P') which do, and those which do not, imply the existence of S, is even more perplexing. Quite apart from the extreme vagueness of the word 'existence,' so that existence *of some sort* belongs inevitably to every nameable thing (S), there remains the question how the implication of existence, even in a more limited meaning of the word, is to be recognised in one proposition and yet not in another of the same form. How are we to distinguish, for instance, between the meaning 'If anything is S, it is P' and the meaning 'There are S's, and all of them are P,' when there is nothing in the expression 'All S are P,' to show which meaning is intended? In predicative statements, of course, as opposed to hypothetical ones, S is necessarily taken as having more than the vaguest kind of existence,[1] but this reflection does not help us until we have got—the very thing we are here seeking—a satisfactory definition of the difference between predicative statements and others.

There seems to be only one way in which these difficulties are to be conquered, namely by making the distinction purely one of actual function, as opposed alike to average function and to structure of sentence. It is not until we regard assertions as parts of an argument that we can properly understand their difference of logical character. We thus identify hypotheticals with major premisses, and categoricals with minor premisses and conclusions, the former being (as we saw at p. 62 and elsewhere) statements of general rule, and the latter statements of (relatively) particular fact. As to the implication

[1] See p. 262.

of existence, it is clear that a major premiss, as such, is a pure inferential, the only statement it makes being 'from A follows C'; to abstract a major premiss from the syllogism, and to regard it as a proposition standing alone, is to abandon just that assertion of the existence (or truth) of A which it is the business of the minor premiss to supply. A major premiss, or pure inferential, must be something different from the major and minor premisses rolled together.

It should not be forgotten that minorless major premisses, and majorless minor premisses, have no existence as assertions. Each by itself would be a sentence devoid of meaning. Regarded as an assertion each exists only relatively to the other; each is called into existence for a temporary purpose, and loses its logical character again when put to another use. Just so it is with inferential and predicative assertions; they are *uses* to which any assertions may be put; they are mere abstractions from the syllogism. The analysis of a conclusion into major and minor premiss is not like the analysis of a physical compound into its elements, but resembles rather the analysis of a concrete thing into its attributes—resembles it at least in the fact that the parts thus distinguished lack independent existence, and in the purpose which nevertheless justifies so artificial an operation. When we distinguish, say, the weight of a sovereign from its hardness and other qualities, each of the qualities so distinguished may serve as a separate test by means of which to judge the assertion that S is a sovereign; and similarly when we analyse the statement that S is P into the two premisses 'S is M' and 'M carries P,' we create

two separate tests, the failure of either of which discovers a flaw in the reasoned judgment. And while the question whether S is M cannot be discussed except on the assumption that S exists (*i.e.* is something partly known), the statement that M carries P involves the statement that not-P carries not-M—that if P is non-existent, M is non-existent also—when existence is taken in *any* sense that gives a value to the distinction between existent and non-existent. Only in that vaguest meaning in which existence is equivalent to nameability, and in which, therefore, there is no point in claiming existence for M, can a major premiss make the claim without stultifying one half of its own meaning.

The double use or meaning of the inferential (in its two 'contra-positive' forms just noticed) is an important feature of it. A rule of inference has always a two-sided application,—may act as major premiss to two different minor premisses, and so guarantee two different conclusions. It has a choice between two antecedent terms, one positive and the other negative, and either of them may become the middle term of a syllogism, while in a predicative assertion (as contrasted with a predicative sentence) it is only the predicate which can serve as middle term. Both these truths, and especially the latter, were much obscured by the old rules of conversion, owing to their pre-occupation with sentences. Sentences may often need conversion before we can see clearly how to put them together as expressing premisses in the first figure. But with assertions the case is otherwise. To predicate is, as we have seen, to give *further* information about a subject already partly known, and so the predicate

term is the only assertive part of a predicative assertion. To find what predicative assertion is made by a given sentence is, therefore, to have already performed upon such sentence all the conversion (or other rearrangement) for which any use, in the special context, can be imagined. Even in the case of inferentials it seems on the whole better not to speak of their conversion (or contraposition), though their two-sided meaning does perhaps give some excuse for doing so. To see a statement as a premiss is to have already arranged its terms in the required order; so that, properly speaking, no premiss is ever converted.

§ 61.—Modality

The inclination to confuse the consequent clause of a hypothetical with the hypothetical as a whole is perhaps the chief relic of the old distinction between pure and 'modal' propositions which modern Formal Logic has preserved. A considerable advance in the recognition of the defects of this distinction has been made in the last two generations, and formal logicians of the present day are ready enough to leave out of account the old doctrine of modality as a whole.[1] If you once begin to count qualifications as modes, it is extremely difficult to find any assertion that cannot be regarded as a qualification of some simpler assertion which might conceivably have been made in its place. Any predication about S, for example, might be called modal as compared with the bare statement that S 'exists.' And even when the conception of modality is restricted to shades of doubt or certainty

[1] Dr. Keynes, for instance (*Formal Logic*, p. 77), says, "The scholastic doctrine of modals may now be regarded as obsolete, and as having only an historical interest."

attached to an assertion, satisfactory treatment of them becomes quite unmanageable.[1] Moreover it lies open to a still more sweeping condemnation; for it is too evident that if you identify 'pure propositions' with *assertoric* assertions,—if you divide assertions into assertoric and modal (*i.e.* non-assertoric)—you are confronted with the question what assertions are *not* assertoric.

In spite of the general inclination, however, on the part of our present Formal Logic to simplify modals out of existence except so far as they can be treated by the Theory of Probability, the old conception that modal assertions must be somehow contrasted with assertoric assertions still survives in connection with the distinction between hypotheticals and categoricals, even in subtler ways than the confusion of a clause with the whole assertion. Remains of it are to be found, for instance, in Mr. W. E. Johnson's treatment of this distinction.[2] It is true that he avoids confusing 'modal' with 'non-assertoric' *generally*, but calls it "assertoric on a different plane, —concerned with the relation between different sorts of terms." But is this really so? When he says that the terms of a modal, as contrasted with an assertoric,

[1] As Dr. Venn says (*Empirical Logic*, p. 241), "We have a whole catalogue of various qualifications: X may be Y; X is most likely Y; I do not know whether X is Y or not; and so on, in quite innumerable forms. And the old Logic, recognising this, made a most painstaking but supremely wearisome and ineffectual attempt to incorporate the principle underlying these various forms into its scheme, in the doctrine of the so-called modals. . . . What we do now in logical science is to make a distinction between those cases of doubt which admit of a numerical estimate, that is, those which rest upon quantitative statistics; and those which are hopelessly vague and indefinite. The latter we let alone. . . . As regards the former our attitude is very different. . . . What we do now, it need hardly be said, is to relegate them to the science of Probabilities. . . ." And in chap. xii. of Dr. Venn's *Logic of Chance* the same view is explained at greater length.

[2] See *Mind*, 1892, p. 18.

are "the thinker and his relation to some judgment which is propounded to him," we fail to see in what respect his 'modal' assertions differ from any others. When a judgment is made there is always a thinker involved, and a more or less reasoned conviction on his part that his decision is justified on the data at present available. And since the dogmatic quality of an assertion depends solely on the assertor's attitude towards criticism, there is nothing to show the amount of this quality present in a given case until the subsequent criticism is incurred. Mere phrases of conviction can be no more than rhetorical flourishes, the motives and meaning of which are easily misunderstood. To insist on a difference between 'X is true' and 'any rational person is bound to assert that X is true' is to do the mere form of sentence too much honour. Is not Mr. Johnson here forgetting a pithy and humorous suggestion of his own,[1] to the effect that we do not increase the force of an assertion by saying that we are quite certain that we *are* quite certain that our assertion is really true? The claim to be true belongs, I submit, to assertions as such, whatever the content asserted may be; and even if it were possible for any assertion to avoid making this claim, it seems a strange paradox to identify such a non-assertoric assertion with the '*assertoric* hypothetical.' Besides, there is no need to drag in any question about modality for the purpose Mr. Johnson has in view. He is distinguishing forms of assertion solely with regard to their use in Symbolic Logic, and he finds that the proposition 'If A, then C' adapts itself best

[1] See *Mind*, vol. xiii. p. 112. I hope the literal inexactness of the quotation is not here important.

to the rest of his system if he takes it as asserting merely a relation of disjunction between A and non-C, and as avoiding[1] any assertion of the direct inferential relation between A and C. A symbolic logician is perfectly within his rights in defining his symbols as he pleases, and there is no need to cast about for extraneous reasons for doing so,—even if the reasons themselves were good ones.

Because an assertion cannot be sometimes true and sometimes false, Mr. Johnson concludes (*ibid.* p. 16) that "the hypothetical which denies the conjunction of the truth of the antecedent with the falsity of the consequent is in its turn denied by simply *affirming* that conjunction absolutely." This is no doubt true of the hypothetical which restricts itself to so small a field of assertion; a large field of assertion is needed to contradict it. But why (except for the strictly limited purposes of Symbolic Logic) is all mention omitted of the hypothetical which has sufficient assertiveness to serve as a major premiss? *That* hypothetical — that interpretation of the sentence 'If A, then C'—instead of "asserting the obligation to assert the relation of disjunction between A and non-C" asserts a direct relation between A and C (or between non-C and non-A), namely, that 'Given A's truth, C's truth follows,' or 'Given C's falsity, A's falsity follows.' The fact that its contradictory asserts the *possible* instead of the *actual* truth of a certain conjunctive is only of interest to those who choose to restrict their view to this aspect of propositions,—a view in which the function of major premiss

[1] *I.e.* as not being contradicted by 'A may be true without C being true.' Mr. Johnson seems to maintain that the direct inferential relation between A and C cannot be asserted. One naturally asks, why should disjunction be the only relation possible?

disappears in favour of other conceptions possibly more convenient for the special purposes of Symbolic Logic.

There seems to be a desire on the part of Symbolic (and Formal) Logic to take the irreducible minimum of meaning as the best interpretation of a sentence. And on the assumption that context is to be left out of account, there is, no doubt, much to be said for doing so. But directly this assumption is given up the case is entirely altered, and we no longer care to put the least possible meaning into a sentence, but seek rather for the meaning actually intended. Perhaps an example[1] will help to make this clearer. Take the sentence 'If A is true, B is false.' We cannot say, by mere inspection of this sentence, standing alone, whether the assertion intended by it is that B's falsity is a legitimate inference from A's truth, or merely that the double event 'A true, B false' is non-existent. But give it a context in the shape of 'If A is true, B is true'—that is to say, suppose both these propositions *given true together*—then, since incompatible assertions cannot be true together, the assertions underlying these sentences cannot be incompatible; we are forced, therefore, to discard the former interpretation and to adopt the latter. Now make another supposition, and imagine that one of the pair—say 'If A is true, B is false'—is not given true except upon some condition,—*e.g.* 'If C is true.' Then our reason for starving the possible meaning of the sentence down to its minimum is again removed, since, on the hypothesis that C is *not* true, the two assertions are compatible even though the direct inferential meaning is intended.

[1] Some readers will recognise that this example is suggested by a logical problem by Lewis Carroll which appeared in *Mind*, 1894, p. 436.

That this treatment of sentences as unstable in meaning should be distasteful to the formal logician need cause us no surprise or uneasiness. He is almost under compulsion to assume that the meaning of a sentence is not a matter for doubtful inquiry at all. In a few particular cases he may be driven to admit the difficulty, but he nevertheless clings to the idea that interpretation is a matter of certain simple universal rules. Such-and-such a structure of sentence, he conceives, carries such-and-such a meaning quite apart from all consideration of context. The restriction is, however, a purely voluntary one, and my contention is that, though it may be useful in Symbolic Logic, it is not to the advantage of Logic generally.[1] We do not best understand a speaker's meaning by insisting that he *must* mean as little as possible. The value of any such rule evidently depends in part upon the question who the speaker is, and what are the circumstances in which, and the purposes for which, the speech is made.

To go back to the general distinction between modal and assertoric assertions. We hold that even when Modality is conceived merely as degree of doubt or certainty entangled with the assertions, nothing can be made of the distinction; partly because an assertion cannot be more than true, and is always problematic except so far as its truth is shown; and partly also because a non-assertoric assertion (as distinct from a non-assertoric sentence) is as little conceivable as a round square. Something—be it ever so vague—is asserted downright, wherever an assertion is made. It is useful, of course, to

[1] So far as Mr. Johnson recognises this (cf. *ibid.* p. 20) the objections here raised attach merely to the suitability of his system for our purposes, and cease entirely to accuse him of *error*.

remember that what looks like a downright assertion may be only a tentative expression of a half-formed opinion; but the use of remembering this is merely to guide us in choosing a suitable rhetorical tone in dealing with it critically. A man whose assertions are practically questions deserves a different kind of treatment at the hands of a critic, from one whose chief anxiety is to beat down opposition or evade it. Still, the distinction has nothing to do with logical theory. If a given 'assertion' is not an assertion, Logic has no concern with it until it is made so at least for the sake of argument.

CHAPTER XI

KINDS OF ARGUMENT, OR REASONING

§ 62.—Deduction and Induction

In the account that is given of the nature of reasoning, excessive attention to form shows itself chiefly (as we noticed in § 3) in the assumption that the process of reasoning can be separated from the subject-matter with which the reasoning is concerned; and, as a consequence, in the creation of a body of logical doctrine which practically leaves out of account the most important of all sources of error in reasoning, viz. our tendency to take 'A' as A too hastily, and thus to reason deductively by means of an ambiguous middle term, and to reach inductive conclusions from insufficiently analysed facts.

The same assumption is largely responsible for the distinction itself between Deduction and Induction, or at least for the importance (other than grammatical) attributed to the former branch of logical doctrine. Perhaps the least unsatisfactory account that can be given of the distinction is that Deduction includes all reasoning in which from given propositions you draw a conclusion supposed to be contained in their meaning, while Induction includes all reasoning in

which you reach a conclusion from observations of fact; so that the latter is the interpretation of fact, while the former is the interpretation of sentences taken as true. Still, Logic is always concerned with the detection of *faulty* reasoning; and since faulty deduction is faulty interpretation of sentences it follows that any general regulative deductive principles must be of a merely grammatical nature, and highly untrustworthy in application.

No doubt some of the defects of the distinction are now widely recognised even by most of those logicians who, for the convenience of teachers, separate their books into two portions called respectively deductive and inductive Logic. For instance, it is pretty generally admitted that there is no induction which is quite independent of deductions from our previous knowledge, and that the more nearly we approach this freedom the more nearly we get the typical faulty induction,—'empirical' judgment on too narrow a basis of fact. But the attempt to preserve the distinction in spite of its defects may lead to much confusion. Sometimes, for instance, we are referred to the etymology of the words deduction and induction, and are told that the former implies an argument leading *down* from general rules to particular cases, while the latter implies an argument leading *on* from old knowledge to new. It is true that the department called Deductive Logic in the textbooks is mainly devoted to the doctrine of the Syllogism, and to processes and technicalities subsidiary to it; and that in the typical syllogism the conclusion is narrower in range than the major premiss, and therefore in a sense a step downward; but on the other hand this same department recognises *as inference*

certain processes in which there is no downward movement of any sort, but a mere recognition of equivalence of meaning under different forms of sentence.[1] And as for the arrival at new knowledge, it is evident that induction has not the monopoly of this, since general rules are often so loosely apprehended that a deductive conclusion from them may have all the surprise of novelty. Indeed, formal logicians should be the last to forget this, since one mistake that they are habitually inclined to make about the Syllogism is to exaggerate the frequency and importance of this aspect of syllogistic reasoning, and to suppose that the question what conclusion any two premisses give is generally so rich in unsuspected results that it constitutes the chief syllogistic problem, rather than the question what premisses are required for guaranteeing the truth of an already proposed conclusion. Probably this view draws support from the old belief that Mathematics is the strict type of reasoning, instead of an extremely abstract and artificial branch of it. Of course if our facts were certainties the case would be different. The difficulty would then be merely that of remembering them and putting them together in large quantities, or in complicated ways. Since, however, the facts we have to deal with are seldom of this convenient description, but are themselves throughout coloured with theory —some of it old and decayed, some of it new and untried, and all of it open to correction—the restriction of Logic to the manipulation of complex symbols involves the neglect of far more important matters. The pressing practical need is that of seeing that the facts are correct; it will be time to consider the

[1] See also § 64.

difficulty of massing undeniable facts together on a large scale when we have succeeded in getting the undeniable facts to play with. By far the greater part of our reasoning, and all of it where the quality of the reasoning is difficult to judge, is a process in which we are constantly going back on our 'facts,' forced to correct them in details which make a difference. In ordinary life, and in science, we normally suspect a truth before we prove it; our reasonings lag behind our guesses, and are an attempt to review the grounds of a belief which has already begun to take shape.

Apart from mathematical reasonings, and from the seldom occurring cases an instance of which was quoted at p. 128 *n.*, the only forward use of the Syllogism is where we deduce conclusions from a theory in order to compare them with fact; indeed, our inquiries into the course of Nature could not be carried on without a frequent resort to this process. But evidently, in so far as doubt has arisen whether a given conclusion is really justified by its premisses, this use of the Syllogism has already ceased to be forward deductive reasoning and has become reflective. The conception, therefore, of syllogistic reasoning as a movement of thought from seen truth to truth not yet seen applies only to the cases which, being comparatively free from doubt, are of least importance to Logic.

§ 63.—Categorical and other Syllogisms

From the unsatisfactory formal distinction between categorical and other propositions, noticed in § 60, follows an equally unsatisfactory distinction between categorical and other syllogisms,—those opposed to

the categorical being either summed together under one name, such as 'hypothetical' or 'conditional,' or divided into hypothetical, conditional, disjunctive, and occasionally other kinds. Both the main division and any minor ones that may be recognised are in Formal Logic made to turn on the question whether one or more hypothetical (or conditional or disjunctive) propositions occur in the premisses. And if what we found above be admitted—that the only hypothetical (*i.e.* non-categorical) propositions are major premisses, and that any proposition, when used as major premiss and regarded in isolation from any minor, is hypothetical—the worthlessness of these formal distinctions is at once apparent. There is no basis for them either in difference of character between different syllogistic arguments or in difference of the meaning of the rules for avoiding invalid conclusions.

To what extent formal logicians would maintain that the distinction between categorical and other syllogisms, or between the various kinds of the non-categorical, have importance for Logic and not merely for Grammar, it is difficult to say; partly because it is not their habit to distinguish carefully between logical and grammatical doctrines, and partly because it is so much their habit to register or preserve distinctions without raising the question what use they are intended to serve. But we should notice at any rate that even in Formal Logic it is recognised that some syllogisms may be viewed as belonging to either of the two main kinds indifferently, and that the principles involved in their recognition may easily be extended to include the other cases.

Although formal logicians are not entirely agreed, it seems safe to take Dr. Keynes as among the most

careful exponents of their views. He notices four kinds of syllogism opposed to the categorical, called respectively *conditional, hypothetical, hypothetico-categorical*,[1] and *disjunctive*. The first two differ from the third in having no 'categorical proposition' in them, and differ from each other according as their three propositions are 'conditional' or 'hypothetical' in the special sense which (following Mr. W. E. Johnson) he attaches to these terms,—the difference being that the antecedent and consequent terms of the 'hypothetical' are propositions, the truth of C following from the truth of A, while the terms of a 'conditional' are predicate terms of the same Subject, so that the proposition can always be reduced to the form 'If any S is A, then that S is C.' Dr. Keynes would apparently allow[2] that the conditional syllogism, and still more easily a syllogism with only one premiss conditional,[3] may be reduced to categorical form, or in other words differs from the categorical syllogism only in expression, not in meaning. He allows also (*Formal Logic*, p. 302) that any hypothetical syllogism may be reduced to a mood of the categorical syllogism. There remains, then, the 'mixed' syllogism and the disjunctive syllogism. As regards the distinction between them, it seems to follow from Dr. Keynes' account (*ibid.* § 141) of the relation between the 'alternative' and the conditional or hypothetical

[1] *Formal Logic*, pp. 300, 312. I will take leave in this chapter to speak of the 'hypothetico-categorical' syllogism as the 'mixed' syllogism, for brevity.

[2] That is to say, he allows (*Formal Logic*, p. 217) that "there is no vital distinction" between conditional and categorical propositions; and (p. 301) that distinctions of mood and figure may be recognised in conditional syllogisms precisely as in categorical ones.

[3] Strictly, this seems to be a fifth kind, or rather to have as much right to separate recognition as the other four kinds have. See *Formal Logic*, p. 300 *note*.

proposition that here also form of expression alone is concerned; and indeed he plainly says (*ibid.* p. 312) that "the force of an alternative as a premiss in an argument is equivalent either to that of a conditional or to that of a hypothetical proposition." When therefore we look beyond merely grammatical considerations, and ask what is the value of the distinction between categorical and other syllogisms, we find that it is only the mixed syllogism which can be supposed to be importantly different from the categorical.

Now we must admit, of course, that there is a difference — which may for some purposes be important—between the assertion that if anything (S) is M, it is P, and the assertion that if A is true, C is true. But the admission says nothing as to whether syllogisms with the one kind of major premiss are importantly different from syllogisms with the other; which is the question now before us. Dr. Keynes argues effectively (*ibid.* § 237) against the view, held by some logicians, that the mixed syllogism lacks a middle term; and finally remarks (*ibid.* p. 309) that whether it can or cannot be actually reduced to pure categorical form, it can at least be shown to be analogous to the ordinary categorical syllogism. He notices further that the *modus ponens* and the *modus tollens* are analogous to certain forms of the categorical syllogism, and that fallacies in the mixed syllogism correspond to certain fallacies in the categorical syllogism. But he does not explain what difference is here taken to exist between a capacity for reduction to categorical form, and the 'analogy' thus recognised; and evidently such difference can depend only on the extent to which difference in the mere form of sentence is allowed to blind us to identity of meaning.

While we freely admit that the distinction between conditionals and hypotheticals, as drawn by Mr. Johnson and Dr. Keynes, presumably has importance for some purpose or other, we must also notice that its defenders nowhere[1] say quite clearly what importance it is supposed to have in producing essentially different kinds of syllogism. The question contains two separate inquiries: (1) Is the major premiss, and (2) is the minor premiss essentially different in the two cases? We may take as typical the forms:—

Conditional.	*Mixed.*
If water is salt, it is X.	If virtue is involuntary, so is vice.
Sea water is salt;	Virtue is involuntary;
∴ Sea water is X.	∴ So is vice.

First as to the major premiss. Is it denied that both these major premisses, in spite of their difference, are 'inferentials,' and as such perform exactly the same function in the respective arguments? The fact, noted by Dr. Keynes (*ibid.* p. 220), that we may have sentences in hypothetical form which have no inferential meaning, is not relevant unless form instead of function be taken as decisive. The question remains, how can any proposition serve as major premiss unless it contains the positive assertion that A carries C. Of course, as we noticed just now in § 61, a symbolic logic may be invented which, for some purpose of its own, limits the meaning of the statement that from the proposition A the proposition C follows, so as to exclude the inferential meaning

[1] The mere fact, noted by Dr. Keynes (*ibid.* p. 301) that the translation of the mixed syllogism into pure categorical form is more difficult than where the major premiss is a 'conditional' cannot be relevant unless no translations except easy ones are to be allowed,—a rule which Formal Logic no doubt tends to act upon, but which it can scarcely uphold, or even interpret satisfactorily.

altogether.[1] But Mr. Johnson, in the passage referred to above, is talking of 'propositional synthesis,' where the problem is to put together any two or more propositions and to read their combined meaning; and evidently two propositions may have a combined meaning even when they do not state the relation of a particular case to a general rule, and where accordingly there is no major premiss involved in the process at all. If I add the statement 'The conjunction of A true with C false is false' to the statement 'The conjunction of A true with C true is false,' they together involve the statement that A is false, but the process has nothing in common with Syllogism, either as here understood or as it is understood in Formal Logic generally,—nothing, that is, except the fact of containing three propositions, one of which is derivable from the other two. Our contention is, not that every process of propositional synthesis requires an inferential major premiss, but that such is required for every combination that comes under the *dictum de omni et nullo* in its widest interpretation; and that it is required equally whether the premisses happen to be expressed in categorical form or not. For instance, with the minor premiss 'virtue is involuntary' you cannot get the conclusion 'vice is involuntary' unless your major premiss does something more than merely deny the truth of the conjunction 'A non-C'; such denial cannot operate to connect the minor premiss with the conclusion unless we proceed beyond it to the positive assertion that from the truth of A the truth of C is inferrible.

[1] This, as we saw above, is what Mr. Johnson appears to intend when he proposes to take it as simply asserting the falsity of a certain conjunction, —the conjunction of A true with C false.

It is therefore in the minor premiss, if anywhere, that we must look for possible reasons for the distinction between the two kinds of syllogism. No doubt there is a difference between the assertion 'S is M' and the assertion 'A is true';[1] but we are seeking for important difference, not merely for difference at large. In what important respect do the two kinds of minor premiss differ? If one of them is a predication and the other not, the difference would, I admit, be important; but is this the case?

The answer is implied in our remarks about predication in §§ 30 and 57. If there is no need that the sentence expressing a predication should contain any definite Subject Term, then 'A is true' may very well be the predicate, and the Subject remain unexpressed,—just as in the statement 'Fire!' And if it is taken to be the predicate, then the 'mixed' syllogism is seen at once to be a mere accidental variety of the typical form *Barbara*. The question what is the best expression that can be found for the unexpressed S is never of much importance, since in predication as such (*i.e.* as opposed to a statement about 'All S' when used as major premiss) the definition of S is, as we saw at pp. 262 and 276, irrelevant. The predicate term is the only interesting part, just as it is the only dangerous part, of any predication,—of any statement which is not an inferential in disguise. Some writers[2] have suggested that where all attempts to specify the Subject fail, we may be content to make 'Reality' into one, and to say 'Reality is such that A is true.' Another suggestion of the same kind is referred to by Dr.

[1] Except where the proposition 'A' says 'S is M.' See p. 281.
[2] *E.g.* Mr. Bosanquet, *Logic*, vol. i. p. 78.

Keynes,[1] where the minor premiss is expressed, 'The actual case is the case of A being true.' Dr. Keynes adds that this is not really satisfactory, but he does not tell us why. Of course no such phrases can pretend to be the only possible expressions for so vague a Subject; nor again can it be claimed that these circuitous ways of saying 'A' have literary excellence of any kind. But the same literary defect attaches to many other translations into logical form, even when Formal Logic considers them satisfactory. No such translations need claim anything more than an explanatory value, such as Dr. Keynes himself seems to allow to the second of the two just quoted, when he says "it is worth giving in order to bring out the analogy between the above example of the *modus ponens* and the categorical syllogism in *Barbara*. The only reason for here referring to these uncouth forms was to answer the question whether this analogy exists.

It may still be asked whether, even admitting that there is no difference of essential character between the framework of categorical syllogisms and that of any others, the difference in the rules for avoiding invalid conclusions does not perhaps amount to a reason for preserving the distinction. They are different sets of rules, certainly, and those which are used for the categorical syllogism are much more complicated than the others. But there is no special virtue in complicated rules where simpler ones are equally effective, and it is demonstrable that the two rules of the 'mixed' syllogism may be reduced to a single one, and that that one is sufficient for guarding against every invalid cate-

[1] *Formal Logic*, p. 304.

gorical mood. This single rule is that no apparent syllogism is valid unless there is complete connection between S and P through M. Thus with the major premiss 'X carries Y' (or 'non-Y carries non-X'), any minor premiss which predicates either non-X or Y fails to establish connection—fails equally, and for the same reason. Our calling the fallacy 'affirmation of the consequent,' or on the other hand 'denial of the antecedent,' depends upon the mere accident which of the two equivalent forms of sentence is used for the major premiss.

In applying this rule to the categorical syllogism, we must remember that we are only inquiring whether its effect is the same in guarding against invalidity, not whether it can be directly and easily used in connection with the rest of the complicated machinery of that system as handed down. We are therefore free to adopt the interesting simplification of the rules which has been worked out by De Morgan, Keynes, and Johnson, the results of which are summed up by Dr. Keynes in § 152 of *Formal Logic*. We there find the rules reduced to two: (α) M must be distributed, and (β) to prove a negative conclusion one of the premisses must be negative. And he has also shown that the only mood rejected by (β), and not also rejected directly or indirectly by (α), is AAO in Fig. 4.

Now in the first place as regards undistributed middle. It is plain that the essence of this defect is the lack of complete connection through M. When reduced to Fig. 1, syllogisms with undistributed middle have their major premiss either 'particular,' or else with non-M for antecedent, while M is the predicate of the minor. But the major premiss

'Some M are P' can only become a statement of general rule if the 'some' are specified as a class—say XM; and then M as predicate in the minor premiss is too vague to establish the required connection, since any S would be correctly called M, even if the fuller description 'xM' were also correct. Virtually, therefore, in these cases M is not shown to be the same in both premisses, and so the connection is not established. And a virtual identification, as opposed to a merely formal one, is what we were trying to find.

In the second place, let us look at the recalcitrant mood AAO in Fig. 4, the one exception among the 232 invalid moods which are theoretically possible. If we leave its conclusion as it stands (in order to keep its S the same as that of the minor premiss), there is only one way of reducing the premisses to Fig. 1, namely, by converting both of them; the minor premiss must be converted *per accidens*, but the major premiss may be converted either *per accidens* (in which case we get an undistributed middle) or by contraposition, in which case we get an even more evident breach of our rule against disconnection through M. So translated, its minor premiss predicates *M* of 'some S,' while its major premiss tells us only that *non-M* carries non-P.

It seems strange that AAO in Fig. 4 should be the sole exception to the rule that undistributed middle includes all syllogistic fallacy, but Dr. Keynes is probably right in saying that from the strictly limited point of view of Formal Logic this mood cannot be shown as necessarily involving (even indirectly) a breach of the rule. It remains true, however, that our explanation in chap. i. (p. 15),

accounting for the plausibility of a conclusion drawn through an undistributed middle, will also account for the plausibility of any invalid mood, since the question there raised was quite independent of the formal logician's question whether the traditional six rules can be reduced to one, or whether all conceivable invalid forms can be accused of a single defect. Evidently a large number of the 232 invalid forms can in no way be considered likely to occur. AAE, for example, in any figure, could hardly deceive even the least initiated reasoner; nor any E conclusion with two affirmative premisses, nor any universal conclusion with two particular premisses.[1] Indeed, if we think of the way in which the long list of invalid forms is arrived at, we see at once that there can be no reason to expect plausibility, or therefore to inquire after its causes, in all of them. Their recognition as possible has nothing to do with an opinion as to their likelihood; the 256 moods out of which they are the discarded majority are mere combinations of the four letters AEIO in groups of three, so as to make 64 possible variations of order, which are then expressed in the four different figures, and so multiplied again by four. The meaning of the propositions has nothing to do with the arrangement; as far as that goes the letters AEIO might just as well be drawn from a bag. Hence it would

[1] We cannot, however, make any satisfactory list of the invalid moods which are plausible—since this quality varies both with the subject-matter and with the person concerned. Thus, even apart from subject-matter, one who would judge a syllogism more by its sound than its sense might accept (in Fig. 1) EEE, III, or OOO, while others who think at all of the meaning would be proportionately less inclined to accept them. Others again might be half tempted by the sound of a mood like EEE or IAA (Fig. 1), but might yet just reject them, and compromise on EEO or IAI as safer. And some beginners, I almost suspect, when sufficiently driven to distraction, will choose a conclusion for a pair of premisses on the principle that it is probably correct in Logic because it is evidently absurd in common sense.

be a miracle if all of them could be regarded as pieces of actual reasoning.

But at the point where guessing or balloting ceases, and thought comes in, the need arises for some *vera causa* as a misleading influence. And since in a valid syllogism the conclusion is contained in the meaning of the premisses, the only rational explanation of an invalid syllogism seems to be that premisses which do not contain the conclusion are imagined to do so by misinterpretation. After sentences have been put into 'logical form,' the subtlest and most effective of all such misinterpretations are some of those due to ambiguous middle (one form of which is undistributed middle), but next in importance to them come the various modes of faulty translation of sentences, among which these five seem to be the chief ones: simple conversion of A; or again of O; the supposition that 'some' means 'some only'; or again that 'No X are Y' implies 'All not-X are Y'; or again that 'All X are Y' implies that Y extends beyond X, and that therefore some Y are not-X. This last is perhaps the likeliest explanation of AAO in Fig. 4. A glance at Euler's diagrams for this mood will show that its defect as a piece of reasoning consists merely in overlooking the bare possibility that S, M, and P are coextensive. One at least of its premisses is held to include a converse O proposition, and thus the mood is mistakenly brought under *Baroko* or *Bokardo*. A rather less simple but equally possible explanation is that the minor premiss is converted *per accidens*, and then the 'some' interpreted as 'some only'—which would involve 'Some S are not-M,' and so create *Baroko* fictitiously.

§ 64.—Mediate and Immediate Inference

Another most unsatisfactory distinction, due to excessive attention to external form, is that between mediate and immediate inference. Unless it is left purely abstract, and not applied to actual pieces of judgment, it depends on the false assumption, universally made in Formal Logic, that there can be no difficulty in saying what is a 'single proposition,' as contrasted with 'two or more propositions';[1] and it necessarily leads Formal Logic either to decline certain inquiries into the nature of inference, or at least to enter into them in a half-hearted manner. The chief of these inquiries are (1) as to the difference between inference and mere interpretation of sentences, and (2) as to whether inference without mediation ever occurs.

In regard to the former of these questions, the practice of Formal Logic seems to be, while generally assuming that the sentence is the same as the assertion, to be shy of pushing the consequences of this assumption quite to their extreme; and hence, while generally assuming that translation from one form of sentence to another is inference from one assertion to another, nevertheless to hesitate about allowing this in every conceivable case—though the exceptions are nowhere clearly stated. For instance, many formal logicians would decline to allow that the change from 'If metals are heated, they expand' to 'Heated metals expand' is an inference, and yet all of them would say unhesitatingly that there is an inference when you take the sentence 'No black things are white,' and turn it round so that it reads 'No white things are black.'

[1] Cp. pp. 117, 143, 273.

Similarly, if you take the sentence 'James is not sober,' and by means of a hyphen alter it into 'James is not-sober,' there again you have got 'another proposition.' And apparently some formal logicians (see above, pp. 281, 295) hold that 'S is P' is a different proposition from 'It is true that S is P'; but whether they would speak of *inference* from one of these to the other is a question which I do not remember to have seen answered.

Of course the chief explanation of this apparently arbitrary distinction is that the first and the last of the above-quoted transformations are not, while the others are, useful in reducing syllogisms to the first figure; for that is the special purpose for which operations like conversion and obversion exist. Still there seems to be no more reason for calling them inferences in the one case than in the other. Where the sentences are equivalent, it is precisely because they are equivalent (and therefore are the same assertion) that we can substitute the one expression for the other. And the passage from 'all' to 'some' is even more clearly not an inference; for if we may not call it an inference where the datum and the conclusion are the same proposition (*e.g.* 'Some men are mortal; therefore some men are mortal'), why should we call it so when the datum only differs from the conclusion in containing (*e.g.* 'All men are mortal') irrelevant matter. No doubt reduction to Fig. 1 is an important process—so important, indeed, for explaining the force of a given syllogism that there is no need to recognise the other figures at all. All the verbal transformations necessary for putting an argument into the first figure may be made without the intermediate step of putting it first into some

other figure.[1] Formal logicians too readily forget that in order to get statements in logical form at all a process of verbal transformation—often much more difficult and risky than converting E or inserting a hyphen between 'not' and the predicate term—has to be performed. It seems somewhat arbitrary to say that if I take the statement 'No news is good news,' and put it into logical form as 'Absence of news is satisfactory,' there is no inference, but only translation, while if I then proceed to alter it further into 'Absence of news is not unsatisfactory,' I have performed an inference.

This criticism, however, affects only the looseness of the distinction drawn by formal logicians between what is inference and what is not. The value of the rules of 'immediate inference'—or some of them—need not be in the least disputed. For instance, where S and P are two classes, compared on the ground of their partial or total inclusion or exclusion, it is sometimes convenient to have a handy rule for avoiding the confusion that may arise about the precise mutuality of the relation; though mutually exclusive classes present no conceivable difficulty, the beginner needs perhaps to be reminded that if all the X's are Y's it does *not* follow that all the Y's are X's, or to be reminded that the proposition 'Some X are not Y' does *not* imply 'Some Y are not X.' Such rules have, no doubt, some value, whether we call it logical or grammatical; and we might even desire, in the

[1] For example, take the argument that whales are not fish, because fish, as such, are without the attribute M which whales possess. There is no need to view this first as *Cesare*, and then reduce it to *Celarent*. If the possession by whales of the attribute M is to be regarded as a fact proving that they are not fish, this can only be by virtue of a general rule that the attribute M carries this consequence. We may dig this meaning out of the sentence given as major premiss without the circuitous process recommended by the traditional Logic.

interests of very young people, a few more of them; for instance, that if X is to the right of Y, then Y is to the left of X; or that if X is the grandson of Y's father's brother, then Y and X are first cousins once removed. If it be an advantage to Logic to contain a large number of detailed rules about the possible relations between X and Y, there are evidently great opportunities for advantageous expansion.

The second branch of inquiry referred to above (p. 301) is, however, more interesting to Logic—the question how far inference without mediation is possible, or whether 'immediate inference,' when it is inference at all, is anything else than mediate inference with the connecting link passed over so lightly that it escapes notice. If we share the modern view of the impossibility of inferring 'from particulars to particulars'; if, for instance, we agree—as I do—with Mr. Bosanquet (*Logic*, ii. 29) that the cases of inference thus viewed by Mill may rather be identified with the species of inference in which a confused or implicit universal is really the ground; how shall we conceive any class of inference as immediate, except in some sense too loose for anything but an admittedly careless Logic? Mr. Bosanquet (*ibid.* 20) seems partly content and partly not content to use the name 'immediate inference' for such processes as Recognition, Abstraction, Comparison, Identification, and Discrimination. That is to say, while calling them 'the true immediate inferences,' he seems also (*ibid.* 27) to regard them as processes which are not strictly independent of a universal, but only of a universal which can easily find definite expression. When, for instance, we compare any concrete case of A with a concrete case of B and find them alike, in what way does the process

differ from that performed by Mill's village matron, who reasons from the particular case of her child Lucy to that of her neighbour's child? The notion of inference seems to demand on the one hand that there shall be difference between the concrete fact reasoned from and the concrete fact reasoned to; and, on the other hand, that there shall be — whether dimly or clearly seen—a universal which connects them.

And if we admit, as we found in chap. iv., that forward inference from known to unknown is no more than the growth of a judgment, must we not also admit that there are always steps in the process, whether easily recognised steps or not? The suddenness of the leap from one truth to another, or from one aspect of an old truth to another, must be illusory and dependent partly on our lack of attention to the workings of the mind that infers. At any rate, the distinction between steps that are easily visible and those that are less easily visible and those that are almost or quite invisible is plainly too loose to be of much value for logical theory. And whether it can be put to any service or not, nothing is gained by confusing 'immediate inference,' in this sense, with translation of sentences from one form into another. As Logic is taught in the textbooks, its only concern with immediate inference seems to lie in framing rules for interpreting various forms of sentence, partly according to their most common acceptation, and partly according to arbitrary agreements among formal logicians—for instance, an agreement that 'some' shall mean 'some at least,' and not 'some only.' There is of course convenience to the logician, as to other people, in knowing the grammar of his

period and country, or the other conventions which his neighbours are likely to accept, but there is more than mere convenience to him in keeping in mind the limits of the importance of these accidental and changeable facts.

PART IV

SUMMARIES

CHAPTER XII

THE CASE AGAINST FORMAL LOGIC

§ 65.—The Limits of the Accusation

For the convenience of readers who are inclined to defend Formal Logic, or at least to think that some of the foregoing scattered charges against it are exaggerated or unduly pressed, it may now be worth while to put these charges together in summary form, in the hope of guarding still further against misunderstandings. I will begin with a few disclaimers of a general kind.

In the first place, the name 'Formal Logic' has here been used (pp. 7-10) as a short expression for 'any Logic which is either systematically or unintentionally more formal than it need be.' The objections are thus intended to lie against contentment with formality rather than against formality *per se*. It is fully admitted that Logic, like any other science, cannot possibly escape formality altogether; that with the best intentions of judging individual cases upon their merits, it is mere illusion to suppose that we can win complete freedom from general rules. It is fully admitted that we cannot move a step in any kind of thought without *using* general rules (pp. 73, 86)[1];

[1] As to the use of general rules in prediction, see p. 24; in the organisation of knowledge, see § 5.

and that the only possible contrast is between accepting this or that general rule uncritically, and on the other hand using it with an eye upon its faults. The defects of Formal Logic, therefore, cannot be remedied by going direct to the opposite extreme. The difference of method proposed is not that between attending only to rules and attending only to exceptions, but between avoiding and welcoming the discovery of exceptions to the rules (pp. 28, 41, 193). Recognition of the defects of Formal Logic does not imply their recognition in season and out of season. A rule when its exceptions are noticed is not destroyed, but only established on a firmer foundation (pp. 40, 61). The defects of Formal Logic are rendered harmless if we hold ourselves ready to recognise them when the fitting occasion comes. Only, I should maintain that such occasions are much more frequent than the existing textbooks ever allow their readers to suppose.

In the second place, the motives of the formal logician may be assumed to be exactly as good as those of his opponent. To hold the view that Formal Logic is careless Logic does not in the least involve the view that the writer of any textbook has shirked his work. Indeed, the misdirected labour of the best of these writers, and of their unfortunate victims who use the books, is one of the reasons for attempting some reform. And evidently two at least of the motives most concerned deserve, in themselves, nothing but admiration—namely, the desire to get certainty as perfect as possible, and the desire to simplify the subject for teaching purposes by leaving questions of detail to be considered afterwards or elsewhere. If these things could be done by Formal

Logic, at a cost which is not excessive, then Formal Logic would be justified. My contention, however (summarised in the next three sections), is that both the certainty and the simplification are in their different ways delusive; that the only perfect axiomatic certainties of Logic are empty truisms of a practically misleading kind; that the assumptions, by means of which simplification is hoped for, lead to unexpected complication and confusion; and that any real simplification achieved by Formal Logic is obtained at excessive cost, since the practical value of Logic is thereby almost destroyed. Logical theory, thus simplified, is applicable only to the flattest and least disputable cases of reasoning. Exactly where Logic is wanted, to improve upon common-sense views, Formal Logic breaks down.

And in the third place, it is also admitted freely that the mistakes and omissions of Formal Logic are for the most part of a subtle, partly defensible kind. Gross and downright blunders are comparatively rare. We have had occasion, indeed, to notice one or two such,—as, for instance, the needlessly confused account of connotation (pp. 245-251), or again the identification of the consequent clause of a hypothetical with the hypothetical as a whole (p. 274); but most of the defects of Formal Logic are of another order altogether, more insidious, and therefore more difficult to cure. For centuries great trouble has been taken in elaborating the system within its self-imposed limits; and where loose and careless views have been adopted from common-sense, or cramped and ignorant views from early science and philosophy, it is often possible to find some excuses for them, either as simplifications for teaching purposes, or on the ground of a laudable

desire to counteract the mischievous kinds of sceptical inquiry (pp. 108, 109) and of verbal quibbling (pp. 153, 154, 176), or on the ground of their adaptability to hurried everyday needs (pp. 54, 208, 216). Always the most difficult charge to bring home is that of excess of zeal in a good cause; and on the whole that is the chief source of the faulty principles and methods of Formal Logic.

The further admission should perhaps be made that some propædeutic value belongs to the traditional system; but the question is, rather, whether a higher value of this kind may not be obtained in another way; and some suggestions to this effect are made in the next chapter. It is of course a commonplace of the art of education that in order to teach a difficult science it is often necessary to tell the beginner much that he will afterwards find to be not strictly true; that you must give him a rough inexact account first, and leave him to add the required corrections later. But if we admit—as I should—that there is some truth in this, still the interesting question always remains how far exactly the compromise should be carried, and how this method should be applied in matters of detail (pp. 52, 53). Merely because the general principle is admitted we are not bound to assume without further inquiry that a particular teaching system—say Formal Logic—carries it exactly to the right point and no further, or even uses it in the right direction. Until these doubts are fairly dealt with, the effective force of any such defence of Formal Logic seems to lie chiefly in the chaotic character of our present theories of education, and the consequent difficulty of disproving hasty assertions or superstitious beliefs as to the best methods. Views about what

the learner can or cannot do are formed almost as lightly and held almost as obstinately as views on the question what subjects provide the best 'mental discipline.' Most of us are a little inclined to believe that our own course of education has peculiar virtue, —that Greek, or Mathematics, or Natural Science, or whatever it may be, is the one most important mental exercise any one can take. When we can say nothing else in favour of an educational subject, we can generally claim that it provides the best possible mental training. People may doubt us or contradict us, but no one can exactly prove us wrong.

However, in the particular case of Formal Logic we can go a little further than the mere recognition that its educational value is not proven; we can show (1) that its supposed simplifications are to a great extent illusory; (2) that where they are not so they restrict the application of Logic to insignificant dimensions; and (3) that their effect is to obstruct as far as possible the improvement of logical theory in its attempt to explain the difference between good and bad reasoning. We will now consider each of these alleged defects in the order given, tracing them to their source partly in the main assumptions which (pp. 16, 17) we have taken to be most essential to Formal Logic, partly in other assumptions which help to support these, and are in turn supported by them, and partly in certain negligent habits of thought and defects of method which are natural in themselves, and are also a natural outcome of these restrictions of view. And we will begin with the least important of the three main charges—the illusoriness of the simplification which Logic hopes to achieve by means of formality.

§ 66.—The Simplification Illusory

The simplification attempted by separating reasoning process from subject-matter (pp. 9-16) is easily understood. Since not even the most formal logician would pretend that all faulty conclusions are entirely due to faults in the 'reasoning process,' we must assume that the object of this separation is mainly methodical, the idea being to attack one part of a large question at a time—to clear the way for questions of detail by making sure of questions of principle first. In itself, at any rate, such an idea is plainly a good one, and is much used both in science and in daily life; the question is, what are its precise effects in Logic?

By restricting attention to the danger of 'reasoning' incorrectly with faultless material we decide to ignore (if we can) all kinds of error in getting a conclusion, except those which are preventible by mechanical rules (pp. 12, 79, 97, 126); and it then only remains to draw up our rules, and to practise the student in using them. This looks very plain, straightforward sailing at first, and it is of course a convenience to be able to say, whenever a real difficulty is encountered, that it lies outside our province. But if the cost of the simplification is reckoned up, we find some rather startling items in it, quite apart from the further question as to the practical and theoretical value of such a system.

On the whole, we have seen that the needless complications are mainly caused by the undue importance given to forms of sentence, and by the confused account of the technical distinctions. As regards the former, this is necessarily involved in the conception

of a reasoning process distinct from subject-matter, and is aided by the confusion between assertion and sentence. For such a conception requires a sharp distinction between a 'piece of reasoning' and a 'single proposition' (p. 111); and this depends on our being able to distinguish between 'one' proposition and 'more than one'; which is only possible if we mean by the 'proposition' merely the sentence (pp. 117, 143, 273, 301). Hence 'reasoning' operations are restricted to the manipulation of ready-prepared material, such as sentences in 'logical form,' and thus deductive Logic is mainly concerned with rules for interpreting sentences (pp. 19, 259, 305). In the traditional Logic the problem is to regulate the interpretation of pairs of sentences which have a term (M) common to both, so as to combine the two into one (the conclusion) by dropping M out of account. But as subsidiary to this operation there are also a number of rules for interpreting single sentences by twisting them into other equivalent forms. The system as a whole enables to do by the help of rules exactly what a machine might do by its construction,—to get perfectly certain results from ready-prepared material. The premisses are put in at one end of the machine, and (if it is controlled so as to avoid 'undistributed middle' and the rest of the formal deductive fallacies) the proper conclusion comes out at the other end triumphantly.

Evidently, if rules for the interpretation of sentences are to be regarded as in any way important, this can only be through the assumption that sentence-forms *as such* have a peculiar virtue. Granted that the identity of the sentence with the assertion is nowhere put forward by Formal Logic as a general

truth without exceptions, and that in such a form it would probably be disclaimed even by those who define a 'proposition' as a sentence indicative and who yet make no express distinction between propositions and assertions (p. 17 *n.*); granted also that every formal logician admits that sentences as given often need to be re-organised before they become the prepared material required for applying the rules of the Syllogism or of 'Immediate Inference'; and that this almost carries with it the further admission that the question how to interpret a given sentence may occasionally be troublesome; still the point is that all difficulties of interpretation except just those which the rules provide for, and which occur only after the 'logical form' has been somehow arrived at, are treated by Formal Logic as lightly as possible (pp. 19, 20, 260, 283). Partly by fixing the student's attention on the simplest kind of predicative sentences, like 'Socrates is mortal,' partly by saying very little about the process of translation into logical form, the impression given by the textbooks is that difficulties in getting satisfactory material for Formal Logic to work upon are not on the whole of much importance. Such difficulties, though their existence is never exactly denied, are treated not as directly affecting the main body of syllogistic doctrine, but rather as small and exceptional matters of detail which can be considered later by those who think it worth while. And the habitual readiness of popular thought to postpone the consideration of difficulties till another time here strengthens the hand of Formal Logic.

This tendency to minimise and neglect difficulties of interpretation has far-reaching evil consequences. One of its minor effects is to complicate the abstract

syllogistic doctrine needlessly (p. 62 *n.*) When the process of translating sentences into logical form is given its due importance we begin to find that there is no good reason for considering that process ended with the arrival at the mere form 'S is P,' but that what is really wanted (for clearing up the general view of the Syllogism) is the translation of given sentences straight into premisses in the first figure (pp. 278, 297, and § 64),—an operation which would add comparatively little to the initial difficulty of getting from colloquial or literary form to the typical predicative form, and would greatly simplify the rules for avoiding syllogistic fallacy. Moreover, the rules of Immediate Inference—so far as they are needed at all—would then be used only in the case where the sentence as given is already in predicative form but is not yet formally brought into the required relation to the other premiss. And since sentences in the simplest predicative form are not very often met with outside the textbooks, the use of the rules of Immediate Inference would be found much more restricted than the textbooks assume it to be. As far as their practical value goes they are both incomplete and in some cases (p. 303) rather trivial. For instance, knowledge of the mutuality of class-relations (conversion) is only a small part of our knowledge of the mutuality of relations in general, and other parts of this wider knowledge are equally wanted for translating sentences into logical form; while knowledge of the fact that two negatives make an affirmative (obversion) is a mental equipment so elementary that a person who did not already possess it would hardly know enough to begin the study of Logic at all.

Further unnecessary complications of logical doc-

trine, which we have found to be due to the confusion between assertion and sentence, are the distinctions (1) between the affirmative and negative copula, and (2) between categorical and other kinds of Syllogism. As regards the former it is evident that so far as the quality of the assertion goes—assertion as distinct from sentence—there is no difference between A and E, or between I and O (§ 58). An E or an O proposition is not, as such, any less affirmative—any cheaper or more cautious—than an A or an I proposition respectively. Why then distinguish E and O as negative; why, in putting sentences into logical form, take any more notice of the accidental position of the negative sign than we take, for instance, of the order of the words in 'Great is Diana'? The effect of doing so is to double the number of typical forms of categorical syllogism required.

Then as regards the distinction between categorical and other syllogisms, we found in § 63 that this unnecessary complication was due to the formal distinction between categorical and hypothetical propositions; which, when applied (according to the habit of Formal Logic) to propositions regarded as separate entities independent of their special context in a syllogism, has no basis outside the use to which sentences of this or that verbal form are *commonly* put,—their average function, as we may call it (p. 275). So that, as soon as it is recognised that a hypothetical or conditional assertion is not constituted by the presence in the sentence of words like 'if' or 'when,' or by any other purely formal details of structure, but solely by its temporary function as major premiss, then the double set of syllogistic rules serves only to darken and confuse logical theory. The essential

requisites of the abstract syllogistic framework are partly hidden under trivial and irrelevant details of difference in the mere form of expression.

In the next place, Formal Logic's systematic neglect of context (§ 52), which is closely related to the confusion between assertion and sentence, works against simplicity and clearness chiefly through the defects of the technical distinctions between kinds of term and of proposition,—through the confused account the textbooks are compelled to give of the 'logical character' of this or that word or sentence. How can there be any real simplification of doctrine where the technicalities whose function is to express the doctrines are not only inexact and self-contradictory but are prevented by the very conditions of their existence from ever emerging into clearness? Our contention is that in this respect the whole foundation of Formal Logic is unsound; that no amount of care and ingenuity spent—as Dr. Keynes and others have freely spent it—in patching up defects in these technicalities, without a radical change in the point of view, can ever succeed in reaching the source of the evil.

An inevitable result of neglecting context in determining logical character is to make the distinctions loose, like those of Grammar (p. 243). We noticed just now the confused account thus given of the distinction between affirmative and negative propositions, and between categoricals and hypotheticals; of distinctions among kinds of term the two that do most to perplex logical doctrine are that between abstract and concrete names (§ 56), and that between general names and all others (§ 54). The conception of abstract names is, we found, a merely

grammatical one, and any attempt to use it with the definiteness required for logical technicalities inevitably causes confusion; as may be seen, for example, from the empty and wearisome discussions as to whether abstract names are general or singular, and whether they are connotative or not (p. 257). And in regard to general names it is clear that to define them as those which are 'capable' of such-and-such uses is to ignore the fact that any name is capable of whatever use we choose to put it to (pp. 242, 251). No doubt, however, 'customarily capable' is what Formal Logic really intends; it intends to draw the distinction between those names which in their average context are class-names and those which in their average context are not so. This again is legitimate enough as a grammatical distinction, confessedly loose; but as a logical one — an instrument for expressing logical doctrines—it breaks down just at the point where firmness is most required. Leaving out of account the more serious results of this looseness of technicality, we have at present only to notice that the simplicity gained by having a terminology in this condition is largely delusive. So long as the main source of difficulties in applying the technical terms is ignored there can be no general agreement among logicians as to their precise application; but each will attempt to meet those particular difficulties which happen to have occurred to him, and the result must be divided counsels among the teachers, and perplexity for the student.

Along with neglect of context we should reckon also as an influence tending to complicate Formal Logic needlessly the habit of regarding technicalities not as instruments of precise expression but rather as

foreign words requiring translation (pp. 42 ff.). Perhaps an excuse may be found in the fact, just noticed, that the traditional account of the technicalities prevents their actually being instruments of precise expression; but a result of this habit is that little or no distinction is made between useful technicalities and others (p. 52), and that consequently any technicality which at any period in the long history of Logic has found a footing in the system has a tendency to stay there after its value is gone. Many, no doubt, are perfectly harmless,—like that between categorematic and syncategorematic words, or between the Goclenian and other kinds of Sorites; others again are now harmless because they are seldom or never referred to when once their definition has been given,—*e.g.* the distinction between positive and negative terms, or between absolute and relative terms, or between collective terms and those contrasted with them. All that we need here notice is that retention of such technicalities, though it may otherwise do no great harm, is a departure from that ideal of simplicity for the sake of which so many of the sacrifices of Formal Logic are presumably made. It has, too, the further result of encouraging common sense to think the study of Logic trivial.

§ 67.—The Doctrines Unimportant

But the failure of Formal Logic to achieve the desired simplicity is the least important of the objections here brought against the system, and perhaps we need not discuss it further. Let us look now at the effect of its real simplifications, and first at their effect in making logical doctrines almost

useless for application in any case where a piece of plausible reasoning is called in question.

The separation of reasoning process from subject-matter, though it involves the confusion of sentence with assertion and thus leads to the complications noticed above, is in itself a real simplification of the problem of Logic, just as we may simplify any difficult subject by ignoring its worst difficulties. When this is done, however, the question always remains whether it was worth doing. If formal logicians have ever faced this question they have not taken their readers into their confidence as to the way in which they would deal with it; they appear rather to assume the value of their crippled science without inquiry, and almost to glory in its limitations. When, for instance, as in Whateley's *Essay on the Province of Reasoning*, the doubt is referred to at all, the line of defence adopted is an indignant remonstrance against the mere suggestion of it. "Why blame us," they seem to be saying, "for not doing things which we have never undertaken to do?" Formal Logic has never pretended, these apologists say, to take account of context, or to discuss the relation between thought and language, or to entertain questions about the subject-matter of reasoning. It recognises, indeed, the existence of indefinite words and ambiguous assertions, but dismisses them as lying outside its province; which is, to trace the relation between *propositions* whose meaning is taken as clearly understood.

Our answer to such a defence is, in the first place, that this is at most the professed intention or aim of Formal Logic; that all existing systems of Logic (except those which are purely symbolic) do in fact

depart to some extent from so simple a purpose, and venture occasionally on more interesting and more difficult ground.[1] And in the second place, that so far as they do *not* 'undertake' this venture, that is precisely the fault we find with them. Contentment with formality can go no further. It is a strange defence against a charge, to plead that the act was done with deliberate intention. If the intention could be justified, of course, that would be a relevant reply.

Then can it be justified? One reason for doubting this is that the theory of good and bad reasoning reached by Formal Logic differs scarcely at all from that contentedly held by common sense, except in the false appearance—due to its elaborate terminology—of being scientific.[2]

Indeed the difference is rather to the disadvantage of Formal Logic, since the latter, besides being equally ready to accept thin wordy arguments as valid, is less able to transcend its own formalities. The special defect of the formal view of the goodness or badness of a piece of reasoning is that it systematically leaves out of account, both in deduction and in induction, the very thing that most affects the character of any actual judgment that is likely to win credence (pp. 66, 93). In consequence of this

[1] Of course no inductive Logic, however formal, can be content to ignore all questions about causation. But even in deductive Logic a similar attraction is inevitably felt towards questions about classification and definition. As Dr. Keynes says (*Formal Logic*, p. 3), "the principles by which valid thought is regulated, and more especially the application of those principles, cannot be adequately discussed unless some account is taken of the way in which [language] actually performs its functions." Evidently this lets in the thin end of a considerable wedge.

[2] The fundamental likeness is in the desire to preserve broad rules, unhampered by troublesome knowledge of their exceptions (pp. 46, 51). Many of the cases in which Formal Logic encourages loose popular views, or distinctions, seem traceable to this desire; for instance, those that were noticed in chapters vi. and vii.

omission it restricts the application of Logic to excessively simple kinds of error in reasoning,—easily preventable mistakes like those we make in adding a column of figures, as opposed to the kind of mistake which has vitality (pp. 74, 83, 126-128, 288). Deductive Logic so treated becomes, as we noticed just now (pp. 315, 319), little more than a department of Grammar, with a false importance given to mechanical rules for interpreting sentences; and though inductive Logic is usually a little less marred by formality, still even there the chief source of error is kept considerably out of focus. Something, but not enough, is generally said about the difficulty of being sure that only one circumstance has varied (pp. 94 ff., 107); and it is said rather by way of afterthought than as part of the main doctrine. As we saw (pp. 93, 127), the chief source of faulty induction is to be found not in ignorance of the abstract canons, but in mistaken applications of them owing to the way in which the defects of general language have helped to obscure the nature of the facts on which the induction is based; so that formality in induction is equivalent to empiricism, or to the acceptance of facts as such-and-such facts without sufficient analysis (pp. 96-99). Similarly the chief source of faulty deduction is to be found not in ignorance of any syllogistic rules (p. 83), but in mistaken applications of them through unnoticed defects in the name M; which again implies insufficient analysis of the facts described (pp. 66, 69, 75). And we saw that ambiguous middle is a serious danger in syllogising just in so far as the ambiguity is well concealed; so that any influence which—like readiness to ignore difficulties of interpretation—tends to leave the subtler ambiguities out of account, tends also to

restrict our power of recognising errors of reasoning to those which are the reverse of serious.

Taking as a whole the theory of the difference between good and bad reasoning, we have found that the more formal it is made the more it tends to neglect (1) the danger of ambiguity in all reasoning, and (2) the dependence of our causal interpretation of observed fact upon the extent of our previous knowledge. We may now notice more exactly how these two defects in theory are chiefly encouraged to persist, and also what is their practical outcome.

First, then, the very nature of ambiguity is misconceived by Formal Logic, chiefly in consequence of some of the assumptions which are inherited from earlier times or adopted too easily from common sense. The old abstract distinction between univocal and equivocal terms (p. 182), even when its looseness in application is to some extent recognised, still encourages the supposition that ambiguity is something which attaches to a *word* isolated from its particular context, instead of to an assertion in which the doubtful word occurs (§ 43); and this view supports and is supported by the common confusion between ambiguity and indefiniteness (§§ 40, 42). The latter confusion again involves the loose assumption that it is only the *degree* of 'indefiniteness or ambiguity' that matters, though no test of the degree is available except just that quality (importance) which the degree is supposed to indicate (§ 41). Quite apart from its defect of question-begging, such a view hinders our recognition that all descriptive words, as such, are indefinite and therefore liable to become ambiguous (pp. 175, 176); it tends to encourage the false popular belief that some words are perfectly safe against

ambiguity, and that the type of an 'ambiguous word' is a word which lends itself to the making of puns, instead of a word which while apparently simple in meaning has actually destroyed the meaning of a particular assertion (pp. 181, 184). To connect the notion of 'ambiguity' specially with the former kind of words is to restrict attention to that kind of indefiniteness which has least effective misleading power. And when this is done, what practical value can we expect from the complacently stated rule that "a middle term must not be ambiguous"? Almost as well might we tell the student that if a syllogism avoids all fallacy the conclusion will be correct.

A further influence tending in the same direction is the survival in Formal Logic of certain traces of the ancient conception of the nature of classes (§§ 33, 36). How much of this actually remains, in our times, it is difficult to say; the mere fact that some of the textbooks give an account of the "Five Predicables" is not by itself conclusive evidence of the survival, since four of them—*genus*, *species*, *difference*, and *accident*—can be transformed and accommodated to the modern view without much difficulty; and the scholastic doctrine of them, and of *proprium*, may (like so much else contained in the textbooks) be merely intended as matter to be learnt by heart and afterwards dispensed with. The distinction between essential and accidental propositions, however (§ 59), is so important that any neglect of its difficulties of application seems to indicate a belief that class-names have some one 'correct' meaning which bars the way to any more elastic use of them (pp. 152, 158-162). And, as we have seen, these difficulties receive, as a rule, scarcely any attention. Then, again, a clear view

of the nature of ambiguity requires a clear view of difficulties of interpretation generally; and this (as we noticed just now, in § 66) is directly discouraged by the whole method and system of Formal Logic.

The assumption that difficulties of interpretation may be almost neglected tends not only—as we saw—to cause unnecessary complication, but also to restrict attention to unimportant matters. Formal Logic pays so much attention to the mere machinery of inference that it has little left for the mental operations which are needed before the material can be fed into the machine (pp. 260, 303). And it is not only the doctrine of the syllogism which is thus crippled, but exactly the same procedure is followed when the formal logician turns his attention to the causal interpretation of observed facts by means of 'inductive methods.' Under his treatment these also (p. 97) become machinery as contrasted with thought. The leading idea of inductive Logic, as taught on the lines of Mill, seems to be to exhibit the framework of *all* reasoning from observed event to causal explanation,—the framework of good and bad reasoning alike,—and to put into language the ideal which every one who has got beyond the most primitive or careless attempts at causal explanation has long instinctively followed. Our effective knowledge of the difference between good and bad inductive reasoning depends not on mere recognition of this ideal, but also (and specially) on knowledge of the actual difficulties in reaching it. In the formal treatment of Induction, the excellence of the Method of Difference is supposed to inhere somehow in the Method itself (pp. 92-96), instead of in the care and knowledge with which we have previously pre-

pared the material to which we apply it. True as it is that inductive Logic can never pretend to lay down general rules as to which concrete circumstances may safely be taken as single and which may not, that is scarcely a reason for overlooking the difficulty. It is not *more* rules that are wanted, but a more intelligent recognition of the defect to which rules as such are liable. Instead of putting forward only examples where we have every reason at present to suppose the causal interpretation sound, inductive Logic should dwell upon the examples which can now be seen as plausible but misleading,—cases where one generation, or one scientific man, has taken perhaps the utmost available care to apply the Method of Difference and yet the next generation has discovered the complexity of some circumstance which was formerly supposed to be single, for upon that kind of discovery progress in our interpretation of Nature chiefly depends; and the quality, good or bad, of any piece of such reasoning is determined (care taken being equal) entirely by the previous knowledge we can bring to bear upon our observation of the facts (p. 98). To concentrate attention on the process as contrasted with the preparation of the material, is to imagine that each act of induction is complete in itself, without roots in the past, or need of revision in the future. Thus the more formal we allow our view of induction to be, the less able are we to see that our conception of any fact, and therefore of its consequences, is always formed under the direction of our previous knowledge of the laws and facts of Nature; which knowledge is what selects for us (well or badly) the important or relevant details in any fact, as those from which it is to be named. And though Logic

cannot undertake to guarantee the soundness of our previous knowledge, it can at least point out the effect of language in giving a false security, and so set us on the track of discovering weak places (p. 96); it can help us to remember—what Formal Logic is everywhere doing its best to hide from us—the necessary imperfections of any piece of verbal description. Instead of putting forward the syllogistic form, or the form of the Method of Difference, as the type of valid inference, it may use these forms for calling attention to the weak places of every argument,—the possible duplicity of a statement of fact which looks sufficiently simple.

In these directions and to this extent, Formal Logic may certainly be said to simplify the problem as to the difference between good and bad reasoning, —just as we may always simplify any problem by declining to take the whole of it into account. The defensibility of this practice depends on the purpose in view. A great deal of detail may, for instance, be neglected in certain astronomical calculations without importantly affecting the result; the motion of the 'fixed' stars may be overlooked, and bodies which are not rigid may be taken as rigid, or surfaces which are irregular taken as perfectly smooth. It is not therefore on the ground of mere general principle that this procedure can be held to interfere with the value of Logic; we must ask more exactly how it affects the results of the special science.

And here the essence of our objection is that Formal Logic ceases to operate just at the point where Logic—as distinct from mere common sense and from Grammar—should begin; or at any rate so near that point that the slight advantage won is not

worth the price paid in learning the confused and over-abundant technicalities. It follows of course from our whole conception of Logic as a progressive and improvable science that all expressions referring to a 'point' at which a scientific Logic begins are inevitably loose and approximate. Since Logic originates in common sense, and since it never ceases to improve upon its own earlier results, there can be no sharp opposition—except what is quite artificial and arbitrary—between 'Logic' and our less elaborate views about reasoning (pp. 39-41). It is not true that the latter are entirely uncritical, nor that that which Logic criticises can never itself deserve the name of Logic. On this account it would be too much to say that Formal Logic has no value. But that the tendency of contentment with formality must be towards contentment with inefficient discrimination between good and bad arguments we can find no room for doubting. What can be expected from a system which does all it can to neglect those difficulties of interpretation, and those defects of language, to which most of our lasting differences of opinion are due; and which does all it can to make mechanical rules take the place of thought?

§ 68.—The Obstruction to Progress

The desire for simplification is not the only motive which is characteristic of Formal Logic, nor even perhaps the one which it regards as the best. The separation of reasoning process from subject-matter, and the other assumptions which co-operate with this in building up the traditional system would probably not be regarded by their staunchest adherents exactly

as scientific principles. If defended at all, they can only be defended as expedients, not as having an independent philosophical value of their own. Very different, however, is the attempt of Formal Logic to base itself on axiomatic certainties like the Laws of Thought and the Law of Causation; an attempt which, while perfectly consistent with the general plan of ignoring difficulties and appealing to common sense, makes also a loftier kind of pretension.

As we noticed in chapter i., there is a deep-seated difference of opinion about the nature of a 'scientific foundation' for Logic; a difference corresponding to that between the older and the newer view of the task of science generally—between the ideal of 'reaching certainty' and that of gradually improving a system of knowledge which ever remains improvable (pp. 28-30, 99, 227). Formal Logic holds that in so far as Logic can be based upon 'undeniable truths' it becomes a science, as contrasted with a chaotic collection of half-formed opinions. The reason of this attitude is not to be found, I think, in anything worse than a survival of old notions of the nature of science. It seems to be chiefly due to the idea that mathematical demonstration is the type of all proof. In saying this, it is not intended to imply that the formal logician necessarily regards Logic as a branch of Mathematics; but only that in trying to find a firm foundation for logical doctrines, his aim is, like that of the mathematician, to trace them back to 'self-evident truths' as distinct from 'admitted truths'—truths which may or may not later turn out to have been too hastily admitted. This was a natural aim enough before the fundamental uncertainty of scientific doctrines had come clearly into view. The prevailing assumption, down at least

to Cartesian times, was that there is no conceivable middle ground between a system of truth built upon undeniable axioms, and on the other hand perfect anarchy. The notion of making the best of provisional truths, and at the same time regarding them as improvable, does not easily flourish in the days when a man may be burnt at the stake for inquiring into the truth or meaning of a formula.

The view most strongly opposed to this—the view here taken throughout—is extremely liable to misinterpretation, in several ways which it may be well to notice. In the first place it must not be supposed that we seek to dispute the axiom that 'real A is real A,' or any other of the undeniable statements referred to (pp. 21, 32). If we could intelligibly dispute them they would deserve far more consideration. Nor do we make any great point of complaining that because they are 'necessary truths' their statement is unnecessary; for the time they take to enunciate, or the space they fill on a page, is itself scarcely worth mentioning. If they were harmless as well as necessary (pp. 36-39) no one would seriously grudge them a place in the books, since few books succeed in wholly avoiding irrelevant flourishes. And it is perhaps needless to say that we must not be credited with any such view as that knowledge is more scientific in proportion to the amount of error it contains, nor again that a chaotic absence of doctrine is in itself a better thing than an orderly array of truth. Our objection involves none of these absurd positions; its basis is of another kind altogether.

The harm done by the axioms does not consist in their being called the foundation of Logic, but in their being considered a firm and satisfactory foundation,

or a means of justifying any logical doctrine which can be deduced from them (pp. 25-27, 161). It would be less misleading to call them the starting-point than the foundation, or even a ladder which has to be kicked away (p. 164). In stating them, all that Formal Logic does is to put into words the pre-suppositions with which every human being begins his life-long investigation of the facts of the universe. In a vague way we learn the axioms of Logic almost before we learn to speak, and a few years later we are freely engaged in applying them, with small reflection upon the possibility of their being misapplied. The rest of our life is spent in finding out, by slow and disconcerting experience, the snares of their application. What we want, therefore, from a science of Logic is not a reminder that the axioms are (in the abstract) perfectly true, still less an optimistic assurance that we need not think of them as misleading; rather, we want a careful exposition of the ways in which, when applied, they actually mislead us,—of the occasions when they break down. We all know that A is A; what we do not know at first is that all errors in reasoning, where the reasoning is anything more than a pretence, may be reduced to the one error of taking some so-called A as really deserving the name (pp. 106, 136, 148, 173, and § 49).

But our objection goes also beyond the mere complaint that enough is not done to guard against the most natural misapplications of these abstract truths. We hold that to state them at all is to state them ambiguously, and so to put an obstacle in the way of discovering the need for care in their application. The ambiguity of the statement that A is A —which may mean either that real A is real A, or

that so-called A is real A (pp. 20-23, 160) — is hidden from the view of Formal Logic partly through its confusion between assertion and sentence and partly through its inability to recognise that a statement which claims to be perfectly abstract thereby declines to claim any assertive force whatever (p. 32). Thus the formal logician is prevented, or at least hindered, from seeing that the only way to make the sentence 'A is A' (taken as a statement about A) do more than express a question-begging truism—the only way to make it an *applicable* statement—is to interpret it as meaning 'so-called A is really A'; *i.e.* as laying down the general rule that there is no appeal from names to the facts behind them. As a statement not about A at all, but about (say) the nature of judgment in general, the sentence can of course be given any meaning we please (p. 159 *n.*); but if we elect (as the ordinary textbook does) to make it a statement about A, then, if it is to be applicable, things or cases which are *taken as* A are the only things or cases it can refer to.

This line of criticism applies not only to the Law of Identity, but, as we have seen, to the other formal foundations of Logic equally (pp. 92, 102, and § 35). In so far as any supposed axiom (about the nature of things, or about the causal connection between them) is left purely abstract and unassailable, it tells us no more than that A is A, while the moment we turn it into an applicable statement it becomes at best an improvable half-truth. And ambiguity is the source of all the harm these axioms do. So far as their ambiguity is unrecognised, its practical effect is to lend support, by allowing a shift between the abstract and the

applicable meaning, to the extremely shaky assertion that things are what they seem to be, or what most people take them for; which is precisely what the baby and the savage believe until they have learnt better. And since the whole of philosophy, or of science, or of any kind of experience, consists in a more or less elaborate war against this crude assumption, one does not see what can be gained—except the preservation of error—by holding it up for reverence.

§ 69.—Appeal for a Defence

The foregoing account of the shortcomings of Formal Logic is put forward in the hope of meeting with corrections. At present the chief difficulty which the opponents of Formal Logic, if they want to be fair, have to contend with, is that so little express defence of it is to be found in the books. In some of the older ones, such as Whately's, it is defended against objections which are quite different from those here brought forward, and most of which it is difficult to imagine any one nowadays seriously making; but in modern textbooks of Formal Logic, it is either assumed that the system needs no defence, or else the merits of 'Logic' are explained almost without reference to the question whether it is the more formal or the less formal Logic which most possesses them. Let me quote Mr. Carveth Read's account of them,[1] as an illustration. The first clause runs as follows:—

[1] *Logic, Deductive and Inductive*, p. 5. Though some of the passages quoted are expressed humorously, I take them as intended, on the whole, to make a serious defence of the traditional Logic. And at any rate they form the completest attempt at a defence I have met with.

Logic states, and partly explains and applies, certain abstract principles which all other sciences take for granted; namely, the axioms above mentioned.

To this we should answer that the value of the *statement* of the axioms depends entirely upon the explanation and application given along with it; that the usual explanation of the logical axioms is so uncritical that it omits altogether to point out their chief defect (ambiguity) and the manner in which it obstructs progress; and that the only application given to them in Formal Logic, is to cases where there is no dispute. However true it may be (as Mr. Read explains, *ibid.* p. 61), that Socrates at one moment is practically the same person as Socrates five minutes later, why should we systematically keep out of sight the extremely numerous cases where a given thing is A at one moment, and less properly A at the next? And change in time is only one of many influences which are always interfering with the axiom that A is A. It can hardly be called an uncommon or an unimportant experience to find a difference of opinion as to whether 'A' is really A or not (pp. 212-214).

Mr. Read's second clause runs as follows:—

By exercising the student in the apprehension of these truths, and in the application of them to particular propositions, it educates the power of abstract thought. For this reason Logic is the best propædeutic to Philosophy, that is, to Metaphysics and Speculative Ethics.

Our contention here is that the defective explanation and application just spoken of can only be said to educate the power of abstract thought in the sense that they educate the power of shifting between two meanings. Such a power, though (as we noticed in

§ 49) it has some scientific and philosophical value, needs control or repression rather than encouragement. Taken by itself, and without due regard to its dangers, we cannot think it a good propædeutic to Philosophy, —except so far as the doubtful excuse holds good that wild oats ought to be sown early. At any rate there seems to be no sufficient reason why educational theories should ignore the fact that unmitigated abstractness is a defect in thought, and that thought as it grows clearer and stronger has more and more grip of the concrete.

Thirdly, Mr. Read says :—

> Every science, when well expounded, is a model of method, and a discipline in close and consecutive thinking. This merit Logic ought to possess in a high degree.

It certainly ought, we admit. But the question whether Formal Logic does possess the merit of being a model of method is one of our points at issue. And in regard to mental discipline, why are we to assume that formality in our Logic makes the discipline any better ?

Next comes a longer clause :—

> As the science of proof, Logic gives an account of the *general* nature of evidence, deductive and inductive, as applied in the physical and social sciences and in the affairs of life. Observe : the *general* nature of such evidence. It would be absurd of the logician to pretend to instruct the Chemist, Economist, and merchant, as to the *special* character of the evidence requisite in their several spheres of judgment. Still, by investigating the general conditions of proof, he sets every man upon his guard against insufficient evidence.
>
> Of course Logic does not, in the first place, teach us to reason. We learn to reason, as we learn to walk and talk, by the natural growth of our powers, with some assistance from friends and neighbours. But, to be frank, few of us walk, talk, or reason,

remarkably well; and, as to reasoning, Logic certainly quickens our sense of bad reasoning, both in others and in ourselves. It helps us to avoid being misled by others, and to correct our own mistakes. A man who reasons deliberately, manages it better after studying Logic than he could before,—if he tries to, if he has not a perverse liking for sophistry, and if he has the sense to know when formalities are out of place. There are some mental qualities that a man can only get from his father and mother.

Our objection here is, first, that the account given by Formal Logic of the nature of evidence is so general, that it covers good and bad evidence indiscriminately (§ 18); that absurd as it would doubtless be for the mere logician to pretend to be, *quâ* logician, a specialist in Chemistry, or in anything else except Logic, yet he can only set other people upon their guard against insufficient evidence in so far as he gives them a little more than the bare outline of sufficiency. It has here been throughout suggested that the best he can do is, to pay special attention to sources of fallacy in so far as they are effective on a wide scale; and that the chief of these is ambiguity,—the one which Formal Logic most neglects to consider.

Logic so transformed might really quicken our sense of bad reasoning; but what Formal Logic does is only to quicken it in the least interesting and important direction, and so to draw our attention away from the serious dangers. In fact, we agree with Mr. Read, that a man may improve his reasoning habits by studying Logic, but we would lay rather more stress on the condition, "if he has the sense to know when formalities are out of place." Why should our possession of that most desirable sense be left entirely to the accidents of our birth? And specially, why should our education do all it can to counteract it?

The next clause is also a long one :—

One application of the science of proof deserves special mention : I mean, to that department of Rhetoric that has been the most developed, relating to persuasion by means of oratory, leader-writing, or pamphleteering. It is usually said that Logic is useful to convince the judgment, not to persuade the will : but one way of persuading the will is to convince the judgment that a certain course is advantageous ; and although this is not always the readiest way, it is the most honourable, and leads to the most enduring results. Logic, in fact, is the backbone of Rhetoric.

Now, it is in view of these last four uses of Logic that it may be treated as an Art. As a science, it explains the relation of truths to one another, especially to certain first principles : as an Art, it regards Truth as an end desired, and points out some of the means of attaining it ; namely, to proceed by a regular method, to test any proposition by the principles of Logic, and to distrust whatever cannot be made consistent with them. It does not give anyone originality and fertility of invention ; but it enables us to check our inferences, revise our conclusions, and chasten the vagaries of ambitious speculation. On account of this corrective function, Logic is sometimes called a Regulative Science.

The first of these paragraphs leaves little room for improvement except in one particular. Granting it true, in a sense, that Logic is the backbone of Rhetoric, we must not therefore assume that *Formal* Logic is the backbone of *good* Rhetoric. We should remember that the quality of any Rhetoric largely depends on that of its backbone. The specimen of Rhetoric given above, at p. 76, admits of being called 'logical' ; and the same is true of many of the most clap-trap arguments on political, social, and economical matters. The question whether Formal Logic is the backbone of good Rhetoric is itself part of our question at issue.

And the same kind of criticism applies to the second paragraph also,—that the explanations given by Logic, whether they are intended to have a practical aim or not, are more or less satisfactory or useful in proportion to the character of the Logic which provides them. Merely because it is the aim of all Logic to make its explanations as good as possible, we must not assume that Formal Logic is the kind of Logic which comes nearest to this ideal; and we are especially bound not to assume it when that is the point at issue. But further we should note—since it is a characteristic defect of Formal Logic—the unsatisfactory conception of 'science' here employed. In whatever sense it may be true that the highest scientific curiosity soars above mere practical considerations, there are few current phrases which can more easily be used to encourage the stagnation of thought (p. 47 *n.*). The clash and interaction between general rules and their particular applications is the vital element in science (§§ 27, 50); so that the attempt to explain the relation of any supposed truth to first principles only ceases to be a wordy illusion when this artificial barrier between the aim of a science and the aim of an art is broken down. There would be no check upon random assertion in the name of science, if science were really divorced from every kind of practical consideration.

One more plea remains :—

"Finally, Logic is at least a refined mental exercise. And it needs no telescopes, microscopes, retorts or scalpels; no observatories, laboratories, or museums: it is, therefore, cheap and convenient. Moreover, it is of old and honourable descent; a man studies Logic in very good company. It is the warp upon which nearly the whole web of ancient, mediæval and modern

philosophy has been woven; and is therefore manifestly indispensable to a liberal education."

The mental exercise which Formal Logic provides has been already referred to (p. 312), and one object of this book has been to show certain respects in which it is capable of much greater refinement. The other advantages mentioned belong to both types of Logic equally, except that our chance of keeping level with our own times, and so making our education sufficiently liberal, depends on our power of understanding not only the virtues but also the vices of those older views from which the modern ones in all their variety are descended.

On the whole, then, it appears that there is little in Mr. Read's defence of Formal Logic which does not apply with greater force to Logic in so far as it strives to avoid formality. The virtues claimed which refer to Formal Logic exclusively are (1) the *statement* of the axioms, as distinguished from their explanation; (2) their illustration by examples of an undisputed kind; and (3) the education in 'abstract thought' so given. In themselves these do not seem to be a sufficient justification for restricting the field of logical operation to the utmost and obstructing the further growth of logical theory (pp. 35, 162, 219; and §§ 27, 50).

Still, the question remains open, what other claims can be made in favour of Formal Logic. Let us hope that some believer in its virtues will come forward and meet as directly as possible those parts of our whole case against the traditional teaching system which seem to him mistaken. The value of such an attempt will depend, of course, upon its relevance to the actual objections made; there would

be no point, for instance, in a laboured proof of the admitted fact that Formal Logic has *some* value, or that every Logic must be to some extent formal. The question is whether the traditional system needs improvement, and what are the lines along which the improvement should proceed.

CHAPTER XIII

HOW LOGIC MIGHT BE TAUGHT

§ 70.—A Method of Simplification

It remains now to consider briefly the question what can be substituted for the unsatisfactory plan of making Logic, for teaching purposes, as formal as possible. Granted that in teaching any subject it is best to begin with relatively easy questions and to proceed gradually, what other way of doing so can be suggested than that of restricting the inquiry by means of postulates and assumptions intended to simplify the main problem by postponing portions of it for future investigation? And the main problem of Logic being to organise our knowledge of the difference between good and bad reasoning, it seems at first difficult to conceive any other way of simplifying it than by separating the form from the matter of reasoning; taking first the general aspect and then the particular complications,—first the outline and then the details which require a closer scrutiny. Whatever defects this plan may have, still if it is our only resource we must put up with them, or else cease from attempting to make the subject teachable.

But I would submit, in the first place, that the

formal rules and the formal definitions are not the only elementary logical matter that may be taught; and in the second place that details or small generalisations are better for the purpose than the widest principles,—the latter being rather for the teacher to consider, and for the student to investigate only at a later stage of his work. Our chief grounds for thinking the old plan unsatisfactory have been summarised in the preceding chapter, but they need not be taken as merely destructive. They involve, rather, a number of leading principles which may be used in directing a course of study, while the difficult questions as to the truth of these principles and as to the full extent of their consequences may be kept in reserve as long as the teacher pleases. Of course the earlier the student can recognise the truth that is in them, the better; but the forcing of this kind of knowledge is a doubtful benefit. The result usually seems to be not an encouragement of philosophical thought, but rather of arrogant partisanship and the use of catchwords ill-understood.

For example, we cannot expect the beginner to see at once all the harm of mechanical rules for distinguishing bad arguments from good ones. But what we can do is to avoid encouraging his natural tendency to seek for short cuts of this kind. He may be set to work more modestly than with the hope of expressly defining once for all the difference between good and bad reasoning, or of learning off-hand how to discover and name the faults of any given argument he meets with (p. 54). And the same with his study of the technicalities; there is no need to trouble him at first with the reasons why he is not required to learn concise definitions which profess to

be complete and final (§ 7), but his attention may be directed rather to the doctrines which the technicalities are needed to express, and through them to the difficulties of interpretation which they have to contend with.

And of all logical doctrines those which relate directly to the use of words in describing facts, and to the part played by description in reasoning, are the most elementary. They apply to the commonest kinds of thought and yet do not lose their value however far we pursue any question in science or philosophy. Here again there is no need to trouble the beginner with the reasons for dwelling upon this subject,—reasons which have been given at some length in Parts I. and II. But the rudiments of it may be studied before he sees exactly where they are going to lead him; in the meantime this study affords room for much criticism of loose popular views, and thus for making steady and gradual progress in logical knowledge.

Additional help might be given by using some of the assumptions of Formal Logic, though in a more guarded manner. The neglect of context, for instance, may be made a really useful simplification if the student is sufficiently warned of its dangers (pp. 242-244); and the same with the confusion between assertion and sentence.[1] For in both these assumptions the harm arises chiefly through taking loose definition by type for exact definition by characters. And even the loosest definition will often serve to prepare the

[1] Among the ordinary effects of this confusion we may note:—neglect of difficulties of interpretation (pp. 19, 163, 260, 273, and § 58); tendency to overlook the emptiness of abstract statements (pp. 33, 36); the assumption that it is easy to distinguish between 'one' proposition and 'more than one' (pp. 117, 143, 273, 301); and needless complication of logical doctrines (§ 66).

ground if we are careful not to take it at more than its proper value (§ 8).

For example, the identification of the general name with the descriptive name need not be misleading if it is openly admitted to be only rough and provisional (p. 250). A doctrine that would form a useful starting-point is that all descriptive names, as such, are indefinite (§ 39); but we should cause unnecessary difficulty if at first we raised the question what, precisely, is a descriptive name. Later, the student will discover that a descriptive name is nothing else than the middle term of a syllogism (p. 356); but at first this would not easily be made clear to him. Therefore it seems permissible to begin by roughly identifying the descriptive name with the kind of name which grammar recognises as a general name, class-name, or common noun, merely explaining that this account of it, though mainly correct, contains a certain amount of error which may for the moment be neglected. The class-name is the *type* of the descriptive name, though it is not true that all class-names, or only class-names, are descriptive.

Starting in this manner, the logical instruction which usefully comes before the direct study of the leading principles may be divided naturally into three parts: 'the class-name as Predicate'; 'Predication and Reasoning'; 'Theory and Fact.'

§ 71.—The Class-Name as Predicate

The peculiarities of the class-name are easily shown, whether it be viewed independently of context or as the predicate term in a piece of description. In the first of these aspects it is evident that any

class-name, as such, belongs indifferently to a number of different individual cases. And in the second aspect we see a defect that arises out of this quality. Just because of its breadth of application — just because it purposely neglects the difference between the members of the class, however few they may be —the description it gives of any one member is incomplete. Each member possesses, besides the characteristics which give him a place in the class, certain individual peculiarities which it is the very function of the class-name to leave out of account. The class-name thus always leaves something unsaid about the individual member (p. 165). And though subdivision of the class alleviates the defect in any given case, it evidently cannot cure it (p. 175). Subdivide a class as far as you please, and there always remains room for further subdivision if the need arises. It is this possibility of future need for subdivision that constitutes the indefiniteness of class-names regarded as descriptive (pp. 196, 197). The class X necessarily blurs the distinction between the X that is A and the X that is not A, and therefore the broad description X fails to say which of these alternatives is intended. This may be called the fundamental defect of the class-name when used as a predicate. And its recognition leads directly on to the other truths about predication which the student of Logic must learn to substitute for the looser views of common sense.

Criticism of loose views always consists in finding unexpected exceptions to general rules, but this often takes the less direct form of finding fault with a distinction.[1] In order to criticise the rule that all A are B, for example, it is not always necessary to

[1] Several examples are referred to in § 73.

find cases of A which are not B. The rule is defective not only when it can be shown to be false, but also when doubts arise about its precise application,—when a difficulty is felt in deciding which cases are properly A and which are not (§§ 4-6). A rule in this vague condition is even more effectively misleading than one that is grossly false; the exceptions to it are less easily seen, since it can only be applied and tested in a rough way; and, in consequence of this, it runs a special risk of resting upon the illegitimate support of the circular argument that all A are B because any case which is not B would not be a case of A 'properly so called,' or because the 'essence' of A is to be B; or, in other words, that A is B because it really is so.[1] Naturally, in so far as any rule draws its support from this kind of reasoning, there is an end to any hope of improving it (§ 68). Hence the attempt to improve logical generalisations has to be ever on guard against satisfaction with rules that are nearly true and therefore useful for rough purposes, but which suffer from this taint of 'abstractness' or vagueness of statement. That is why so much of the work of the logician consists in finding fault with loose distinctions.

Now if all class-names are indefinite it follows at once that the distinction between definite and indefinite ones (or as the older Logic used to call it, univocal and equivocal) is loose and unsatisfactory (pp. 182, 207). It can at most attempt to mark off broadly the less from the more indefinite; it cannot be

[1] As examples of this danger we may note:—The 'Substitution of Similars' (p. 22); statements of 'tendency' (p. 32); certain other statements (p. 38); circular definitions (p. 49); inductive axioms (pp. 95, 97, 102); definition of 'reasoning' (p. 114); Law of Identity (p. 160); Agassiz and immutable species (p. 162 *n.*); degrees of indefiniteness (pp. 180, 199, 207).

trusted to tell us that such-and-such a name, since it is 'definite' is safe from any further inquiry into its meaning. Moreover, even the comparatively modest distinction between the less and the more indefinite has the defect of being inapplicable to given class-names until after the purpose for which alone we can want to apply it is satisfied. The only conceivable purpose of the distinction is to mark off those names which need definition from those which do not, but the notion of degrees of indefiniteness cannot be given any meaning which bears upon this question unless the 'more indefinite' names are completely identified with those that are in greater need of definition (pp. 180, 199); and then the doctrine that the less indefinite any name is, the more it escapes this need, would tell us only that a name escapes the need of definition just so far as it really does so.

The distinction between univocal and equivocal (or even between more or less definite) class-names is thus seen to form an insecure basis for any logical doctrine restricting the need, or the right, of enquiring after a definition in given cases; and the recognition of this negative truth leads us into conflict with several other loose views and rough definitions which common sense is inclined to take as trustworthy beyond their deserts. Among these may be mentioned first the distinction between natural and artificial classes (pp. 155-157), and the view that some classes —natural ones especially—have a 'correct' meaning which can be given by a definition and then used to prevent casuistic doubts from being raised. Even the so-called natural classes, it must now be admitted, resemble the most artificial classes in the fact that the class-members are different from each other,

though the differences may be less obvious, and are usually less important, on the whole, than in the case of classes which are plainly artificial. If (as with two apparently pure specimens of gold) the differences are obscure, this determines only the likelihood, not the certainty, that difficult questions of definition will never usefully arise when the name is used as a predicate (§ 39, and pp. 190-194, 205 ff.); and an unlikely question when it does arise is more perplexing than a likely one. Nor does the general utility of a class-name save it from being of doubtful value now and then. For instance, the notion 'Truth' (the class-name 'true statement') is of the utmost utility, and yet the more convinced we are that we can clearly separate truth from error the less prepared are we to recognise the traces of error that certain kinds of valuable half-truth contain. Strict Logic here comes into opposition with the tendency of popular thought to stifle questions which suffer from this kind of paradox, without inquiring into their justification; a tendency which finds general expression in the 'Law of Identity.' Instead of accepting the axiom that A is A, in the only sense in which it can be supposed to give information about the use of the class-name A, the logician ought to supplement this half-truth of common sense by the reflection that though the world's application of a well-known class-name is generally more right than a clever young person imagines, yet occasionally the reverse is the case; and room must be made for this possibility in any careful logical doctrine. Taken strictly, and interpreted as applicable generalisations, the Laws of Thought involve, as we saw (p. 164), the assumption that ambiguity is impossible. Since,

however, this would be too absurd a position for even the most elementary Logic to take up, and since it is also easier not to interpret them quite so strictly, their usual effect is to produce a milder form of the same assumption,—namely, that ambiguity is a fault that may be reckoned as of small account (p. 177); or as so exceptional, and so seldom a serious cause of error, that it bears much the same relation to thought in general that puns bear to the ordinary use of language (pp. 184, 186).

The student should therefore be guarded against the natural impression that he is here being troubled to notice an out-of-the-way fact which can scarcely ever be of practical service. On the contrary, the admission of this apparently far-fetched truth is of interest and value, not only for its occasional direct application, but because it has also some important consequences; its opponents may regard it as the letting out of the waters, while its supporters will picture it rather as the removal of a blank wall that bars the light. For in the first place it helps to explain the process by which our knowledge of Nature grows, and to further that process in various indirect ways (chap. viii.). And in the second place, as a means to this end, and as a subject of more immediate interest at the beginning of a course of logical study, it helps us in getting a view of the nature of reasoning, and of the defects to which reasoning is liable, especially those defects which are all the more misleading because they are not easily seen.

§ 72.—Predication and Reasoning

For, first, there is then no longer any difficulty in admitting that every predication, with a class-name as predicate, is liable to be disputed on the ground that some other definition of the predicate term is contemplated than that which suits the present purpose. Of course a good many predications are liable also to be disputed on a less subtle ground than this,—namely, on the ground that S does not really, but only apparently, come under the *general* definition of A. But disputes of this nature are more easily settled, and therefore of smaller interest to Logic, than where S admittedly comes under the general definition of A, but where one party suspects, while the other does not, that the case is exceptional, and that a further subdivision of the class A is here required (§ 47). Since progress in our knowledge of Nature consists mainly in improving rules by registering exceptions, any habit—such as excessive regard for a general definition, or for the maxim that A is A—which hinders our view of exceptions, is one which Logic cannot be justified in encouraging. One does not need to learn how to miss seeing exceptions; that faculty is a widespread natural gift, like other kinds of limited perception.

And next, when we ask what is meant by the 'purpose' of a predication, the answer is that that is always the drawing of some conclusion syllogistically (§§ 27, 28, and p. 167); and that therefore the meaning of a predicate term, in cases where there is any conflict between general and particular meaning, is determined by the conclu-

sion which the predication is meant to support. Naturally it is only where the conflict between general and particular meaning arises, or in other words where the audience have a suspicion that some false inference is drawn, based upon the general resemblance of S to the rest of the class A, that any reference is made to the special purpose. But that amounts only to saying that such reference is not made where the assertion is either plainly false or plainly true; and these are, from a logical point of view, a small and unimportant class of assertions. The more careful we are in distinguishing between truth and error, the more our attention is drawn to the prevalence of the intermediate class of statements, where S is A in one sense, but not in another, and specially where S is A in a broad and general sense, but where this fact is used to support conclusions it will not properly cover. It is in these cases that criticism usefully takes the line of remembering that we cannot intelligently assent to a statement until we are clear about its meaning, and that the final account of its meaning is not given by the general definition of its terms, but by the purpose of the moment.

A study of the nature of predication, and of the risk it always runs owing to the indefiniteness of class-names, leads in this manner to a view of the syllogistic process, and its special danger the ambiguity of the middle term. Every predicative assertion, it now appears, is in one aspect a minor premiss (p. 276). There is a conclusion to which it leads, and a major premiss connecting it with that conclusion. The question being asked whether S is A, a suspicion arises that the answer depends on the

meaning given to 'A,'—the suspicion that though S may be A in a sense, it is not so in the sense that warrants the conclusion intended to follow from it. And, if the suspicion is justified, then we have a case of the typical deceptive syllogism; where, though each premiss taken by itself may be true, yet when they are put together the conclusion is faulty through ambiguity of the middle term (pp. 133, 134).

From this aspect of the syllogism, where the relation between premisses and conclusion is used in raising the question whether the minor premiss is true, it is an easy step to the other aspect of it where the truth of the conclusion is the matter in dispute. The syllogistic framework and its requisites remain exactly the same whatever use it is put to. We may, for instance, have as major premiss a mere definition,—a postulate instead of a generalisation. And then the possible doubt attaches only to the minor premiss and conclusion. But we may also easily conceive another syllogism in which the assertion directly questioned is the conclusion, and where accordingly both premisses are on their trial. In other words, any statement of fact may have its own grounds inquired into, besides being used to lead on to further conclusions. Behind any statement of fact there are always other statements of fact and the theories which give the latter their relevance (pp. 60, 82).

There is very little that need be taught about the Syllogism, since the process itself—which is merely that of bringing a particular case under a general rule (pp. 62, 72-74, 294)—is used instinctively by every one from early childhood onwards; and if it be true

that there are any lower animals whose thoughts are cast in a different mould, we have no beginnings of a conception what that mould can be.[1] What we have not got by instinct is, first, the conscious analysis of syllogistic thought into the two premisses and the conclusion; and secondly, a knowledge of the ways in which words deceive us into taking a faulty syllogism as correct. The analysis is only useful in so far as it is made to help forward the latter branch of knowledge. It is partly, no doubt, because the dog has had no instruction in technical Logic that he argues so contentedly about the scalding qualities of cold water. The middle term he uses is the concept corresponding to our English word 'water,' and he neglects to subdivide the class into hot and cold.

Now the ways in which words deceive our thoughts are divisible into two main kinds, of which only one is treated by Formal Logic. There may be lax interpretation of sentence forms, and there may be ambiguous statement either of the particular fact or of the general rule. As regards the former, we have seen (§ 66) that any rules for interpreting sentences are either purely grammatical and customary—and then they can only serve as a very rough guide to the meaning actually intended—or else they are conventions independent of general custom, conventions made by formal logicians in exactly the same way as the symbolic logician postulates the meaning of his symbols; for example, the rule that 'some' shall mean 'some at least' and not 'some only.' The mistake that Formal Logic makes is in giving such rules too much importance. They are in no sense

[1] As regards inference 'from particulars to particulars' see § 25, and p. 304.

binding, and what importance they have consists in pointing out certain kinds of doubt as to meaning that frequently occur and that need removing by interrogation. For this reason it may be worth while to call the student's attention to some of the cases—such as the doubt whether 'All A are B' is or is not intended to assert also that all B are A, or the doubt whether 'Some A are B' is meant to imply also that some are not (pp. 300, 303). No harm can be done by this kind of instruction so long as we avoid supposing that certain meanings attached to certain forms of sentence would be *illogical*. Even when the expression deserves to be called slovenly rather than epigrammatic, still there is a difference between slovenly expression and slovenly thought (pp. 77, 78). Logic has enough to do without undertaking to be a judge of literary style.

It is therefore the risk of ambiguous middle that Logic has chiefly to consider in its view of the syllogistic process, and a study of the nature of predication (showing the necessary indefiniteness of class-names when used as predicates) prepares the way for this. Having now seen that every predicative statement gets its meaning as a minor premiss, and also that every statement of fact gets its meaning in so far as the fact is brought under general rule (and thus forms a minor premiss), the student will see also that every statement of fact is descriptive statement. Thus he may now enlarge his notion of the descriptive name, ceasing to identify it with the general name, and conceiving it as the middle term of a syllogism. Any name, it now appears (whether Grammar would call it a general name or not) is descriptive when used as a middle term, and in no other usage. It is

in this usage only that a name's indefiniteness can cause ambiguity (§ 43, and p. 262).

Hence, too, we get some understanding of the peculiar difficulties that are always encountered in induction,—in basing general rules upon particular cases observed. The student might next enter upon that most important branch of logical inquiry, the attempt to improve our rough common-sense views of the relation between theory and fact. When it is sought to prove syllogistically that S is P, three things are required,—the *fact* that S is M, the *theory* that M indicates P, and grounds for believing that M is here free from ambiguity,—or, in other words, that this fact and theory hold good not only as independent statements true in some sense or other, but even when they are put together as premisses. Here we begin to see the defects of any separation between deductive and inductive Logic; the binding force of a syllogism cannot be understood except so far as we understand what is involved in avoiding ambiguous middle, and to do this we have also to understand how general theories of causal connexion (M indicates P) are derived from facts observed, how they are strengthened by them and criticised by them, and generally how fact and theory envisage each other (pp. 66, 71, 84, 94). The question whether S is or is not the kind of M that indicates P, is of vital importance in judging the validity of a syllogism, and it can only be studied by considering questions which are commonly reckoned as belonging to inductive Logic.

§ 73.—Theory and Fact

From this point onward, further steps may be taken more rapidly. Theories being generalisations which pretend to cover particular cases, and facts being of wholly unspecified content except so far as they are described in general terms, it follows that the question whether a given theory is true depends in the first place upon the absence of facts that contradict it, while, on the other hand, the question whether an apparently contradictory fact is really an exception to the rule depends upon the correctness of that fact's description. The chief thing to avoid is any cheap solution of this difficulty, such as the device of making the assertion of theory abstract and undeniable. Where a word X has many shades of meaning in common usage—say, the word 'liberty,' or the word 'civilisation'—we often find that a general assertion about X becomes less open to attack by contradictory instances when we explain that some of the looser meanings of the word are left out of account. These, we may say, are only cases of X by courtesy, or on the surface, or by some traditional misuse of the term. X, when it really deserves to be called X, is Y. And only a narrow line, easily overstepped, exists between this legitimate and often almost unavoidable procedure, and that of declining to allow *any* case to be called X until we know that it is Y. This is one of the great dangers of theorising,—that in our search for essential connections we shall refine and abstract until the wholesome criticism exercised by 'fact,' or concrete cases, becomes impossible (§ 68). When that point is

reached, our supposed generalisation has dwindled away to a mere question-begging truism.

A partial recognition of the complex relation thus existing between theory and fact is, no doubt, common enough. Everyone knows that theories ought to stand the test of fact, and that since facts are not always what they seem, an apparent exception to a rule may turn out not to be an exception after all. But a much fuller recognition of the way in which facts and theories aid and criticise each other is possible when we have understood why indefiniteness is not merely an occasional incident of descriptive language, but is a fundamental quality of it (p. 325). For then we find a rational ground for our otherwise vague and hesitating criticism of certain loose distinctions, whose evident convenience (within proper limits) is constantly inducing us to overlook their faults. Chief among these are the distinction between certain and doubtful facts (p. 146), and between undeniable generalisations and questionable ones (p. 88), their faults being precisely analogous to those of the distinction between perfect and imperfect definiteness, or between complete and incomplete description. Since anything which professes to be a truth has to be stated in language, it is always a *statement* of fact or a *statement* of theory that we have to deal with, not fact or theory considered somehow apart from our only instrument for expressing them (pp. 122, 142, 227, 228). Hence the defects which are inherent in language must also be taken into account in examining a statement of either kind, and the result is an increased power of rationally criticising facts and theories, however superficially plausible they may be. We no longer trust the

common distinction between the 'bare' statement and the descriptive statement of a fact, or imagine that any fact as stated is free from theory (§ 31); we no longer trust the distinction between abstract and concrete assertions (pp. 255, 256, 270); but we recognise that any statement, if purely abstract, would fail to be an assertion, and that all general statements, in so far as they are assertive, are abstract and concrete at once, their quality of abstractness being the source of their vagueness and consequent misleading power,—the very thing which it is the task of science to diminish as persistently as possible. Casuistry is thus seen to be the mainspring of the progress of knowledge.

Two other distinctions, commonly trusted beyond their deserts, are also discredited by this line of criticism,—the distinction between questions of fact and questions of meaning (§ 49), and the distinction between a 'single' fact and a group of facts (§ 13, and pp. 94, 173). As regards the former of these, its influence is directly antagonistic to a clear conception of the work that is everywhere waiting to be done by casuistry. However great may be our personal admiration for Dr. Johnson, yet it is clear that if all the questions which he was inclined to regard as simple questions of fact had remained to this day in so flat a condition, our stock of knowledge would have been considerably poorer than it is. Readiness to 'make an end on't' is hardly the way to prosecute an enquiry with vigour, and though practical considerations may often justify such readiness in a given case, there is all the difference between ceasing an inquiry for a time through force of circumstances and imagining that such closure can be

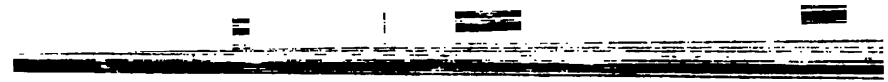
permanent or should be encouraged without special reason. The mere habit of preventing questions of fact from becoming questions of meaning is not in itself of scientific value, but only so far as hurry or other necessity drives us to put up with a makeshift answer till better opportunities are found.

The faults of the distinction between single facts (or single circumstances) and complex ones are plainly of direct importance to our view of the difference between good and bad reasoning. To take a fact as single when it is really complex is the same thing as to submit the fact to insufficient analysis. In §§ 12 and 13 we saw how in syllogistic reasoning this is the source of ambiguous middle. The fact S is described as M, and if we forget that this, being a general name, is indefinite, we jump uncritically to the conclusion which follows from an accepted rule that M indicates P. To take precautions against the risk of faulty connection between the premisses is to look beyond the fact's general nature to its individual peculiarities. However simple it may appear when regarded merely as a member of the class M, this aspect of it is never all that the fact contains. It is made up of details, which the name M may hide but cannot abolish (p. 69). It is only a 'single' fact, therefore, so long as we are content to regard it as single (p. 173); and to inquire into its right to the name M with a view to the indication of P is to break it up into a group of facts, of greater or less importance to the imagined connection. Thus the utmost verbal simplicity in the description of a fact has nothing corresponding to it in the concrete world, and to forget this is to open the door to faulty reasoning.

Similarly when the problem is to judge the precise causal relation between two facts observed. What we observe is the happening of facts, but in order to conceive them as such and such facts we have to use general names. We have, therefore, to select out of all that is really going on before us certain partial aspects in which the occurrences may be viewed; we have to simplify the occurrences artificially. And the difference between careless and careful work of this kind evidently depends upon our power to remember that the simplification is artificial and may be reconsidered and done over again in other ways (pp. 127, 136, 288, 289). Because we have called the facts X and Y (or A and a) we have not thereby closed the question whether some of the hitherto unconsidered details in them—details obscured by the names employed—do not deserve greater consideration. Fallacy, in inductive reasoning, consists in overlooking details which are wrongly hidden by a general name.

Along these lines the student may arrive at the view that mistakes in reasoning are nothing but mistakes in the facts from which the reasoning proceeds,—a view which subjects the common distinction between reasoning and judgment to the same kind of criticism as the other distinctions above noticed. He will find that there is no unreasoned judgment, and no reasoning process apart from its subject-matter; but that in every judgment more or less criticism is entangled (p. 116), such criticism being the element in any judgment which makes it a reasoned judgment as contrasted with what an unreasoned judgment would be if such a thing could be found. In forming any judgment we use facts and theories, or new knowledge and old, both these aids to judgment

being at all times liable to revision and improvement. And revision always takes place in the same way,—through finding that a fact described as A might better have had a different predicate. The case where our newly observed facts are wrongly observed has just been spoken of; and the case where our stored-up general knowledge is faulty is only the same thing at another remove. Where we have accepted a wrong view of the causal connection between X and Y, which leads to our reading a wrong meaning into a newly observed fact, the error did not originate from nothing, but is traceable to a previous misconception of fact observed. Our modern errors therefore have a pedigree, and Logic will remain an almost useless study so long as we forget that it is in the subject-matter of reasoning, not in any abstract 'reasoning process,' that all effective error is concealed.



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